

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL
FOUNDED 1880



WORKING IN THE DARK?

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2
3
4

**INLAND
OPEN HEARTH
STEEL**

Let Inland throw light on your sheet steel problems

WHEN it takes a steel company many years of intense study to "know steel," it would naturally be difficult for users of steel sheets to select the best material at all times for the job at hand. Yet your business success demands that you always furnish the proper grade. If the steel fails quicker than the customer expects, careful workmanship is forgotten.

A safe policy is to standardize on Inland Sheets—thus securing as good sheets as can be made for the purpose. Every Inland Sheet is the result of nearly 40 years' experience, of wide research and knowledge, and of complete control of materials from mine to you, assuring complete satisfaction on every job that passes through your hands. INLAND STEEL COMPANY, 38 South Dearborn St., Chicago.

INLAND
ABLE SERVANT OF THE CENTRAL WEST

Sheets Rivets
Bars Billets
Bands Plates Structural Rails Track Accessories

STEEL

APRIL 13, 1931

"Weather Control" All in One Unit



**Automatic Forced Air Oil-Burning
Heating and Ventilating System
with 7 Point Advantage**

POINTS 2 AND 3

2—A Warm Air Furnace of special construction is made with heat economizer and keeps more heat in the house and wastes less up the chimney.

3—An Automatic Oil-Burner of exclusive design. The Piatt employs a thoroughly tested principle of combustion with no complicated parts to get out of order. The furnace and burner are made as one unit to work together as a unit.

"Weather Control"—that's the latest thing to sell. It gives Piatt dealers 7 big talking points which are difficult for competition to meet at a price that is almost impossible to beat. Just note these 7 points of superiority: 1—"Weather Control" all in one unit. 2—A Warm Air Combustion Chamber of special construction. 3—An Automatic Oil-Burner of exclusive design. 4—Forced Air Blower, carries warm or cool air to every corner of the house. 5—Humidifier, keeps air properly moistened for health. 6—Thermostat of accepted type, thoroughly reliable. 7—All in one unit—all for the price of a good oil-burner alone.

Get started now. Send in the coupon below and start getting the profits other Piatt dealers are making.

**MOTOR WHEEL CORPORATION,
Heater Division, LANSING, MICHIGAN**

SEE OUR DISPLAY AT THE
NATIONAL OIL-BURNER SHOW
PHILADELPHIA, APRIL 13-18, BOOTH 4 AND

 **PIATT**
DOMESTIC UTILITIES

MotorWheel Corp., Dept. 256, Heater Division, LANSING, MICH.

Send me at once, full information on the "Weather Control" Oil-Burning Heating and Ventilating System. I am not obligating myself, but will study the details carefully.

Name

(Please print or typewrite)

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Mr. Business

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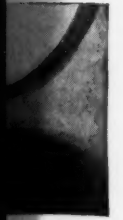
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True Talks

with successful sheet metal men

SERIES No. 1

NUMBER 2

JERSEY FIRM BOOSTS SALES WITH MONEL METAL JOBS

▲▲▲ Modern selling methods and fine craftsmanship have won customers for Metal Products Corp.

Finds growing demand for Monel Metal equipment in chemical and textile plants

The Metal Products Corp. of Weehawken, N. J. is in line for congratulations and praise. Congratulations on the sales records it has chalked up year after year, and praise for the high standards of workmanship and quality construction it has always maintained.

The Metal Products Corp. is one of the most progressive and fastest growing sheet metal concerns in New Jersey. Under the energetic leadership of L. A. Theisen, president and treasurer, the staff of wide-awake business getters pictured here has



Three live wires who built a fine business. Left to right: L. A. Theisen, Pres. and Treas., G. A. Theisen, Vice-Pres. and E. J. Theisen, Sec'y., Metal Products Corp.

hung up an enviable record in the face of stiff competition.

One reason why the Metal Products Corp. stands where it does today is because its principals have devoted time and energy developing demand for Monel Metal jobs.

About eight years ago, Mr. Theisen came to the shrewd conclusion that there was a large potential market for Monel Metal equipment among chemical and textile plants, dye houses and laundries. He realized that Monel Metal offered the ideal combination of properties and advantages for this service. He started to show his prospects how Monel Metal's rust-immunity, corrosion-resistance, steel-like strength, cleanability and remarkable durability reduce operating costs and contribute to higher quality of product or service.

As a result of this aggressive selling policy, the Metal Products Corp. has been successful in landing some of the largest and most profitable Monel Metal jobs in the state. These installations have proved to be strong advertisements and have



Storage tank with shut-off outlet, built of Monel Metal by Metal Products Corp.



Heavily constructed Monel Metal pans used in chemical plants, built by Metal Products Corp., Weehawken, N. J.

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

A HIGH NICKEL ALLOY

MONEL METAL 
NICKEL ALLOYS LOOK BETTER LONGER

played an important part in winning new customers for the fabricator.

The company also makes and sells Monel Metal utensils, and reports excellent progress in this department of the business.

Send for booklet "New Business Waiting To Be Found."

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Published Every Other Week by Porter, Spofford, Langtry Corp., 139 North Clark Street, Chicago, Illinois. AMERICAN ARTISAN—the Warm Air Heating and Sheet Metal Journal—entered as second class matter, January 29, 1930, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.

INDEX PAGES—16 and 64

[VOL. 100, NO. 8—\$2.00 PER YEAR]

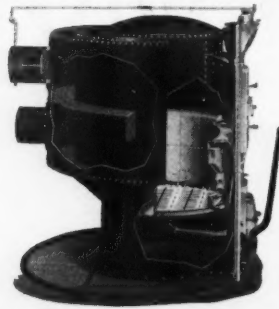
BUYERS' DIRECTORY—60 and 62

THE MOST COMPLETE AND ADAPTABLE LINE OF STEEL FURNACES IN THE INDUSTRY

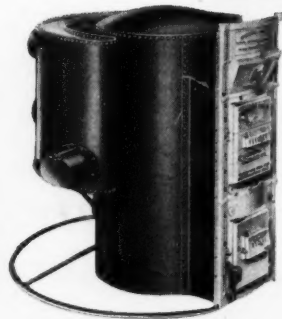
together with practical merchandising service, powerful advertising and sound engineering help tells you why so many prominent and prosperous warm air heating contractors are Torrid Zone dealers.



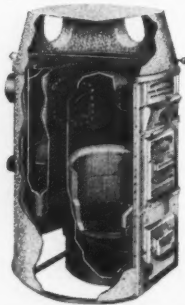
The Standard Torrid Zone for all types of fuels. Made in six body diameters and four different heights.



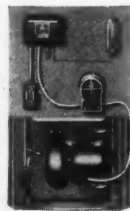
The H. C. Model Torrid Zone for hard coal coke and oil. The extreme horse-shoe radiator is ideal for these fuels.



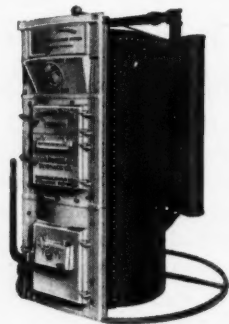
The Hard Coal model showing tremendous heating surface. Made in six diameters and four different heights.



The Standard model showing the new and highly efficient radiator partition. The smoke travel is self-cleaning.



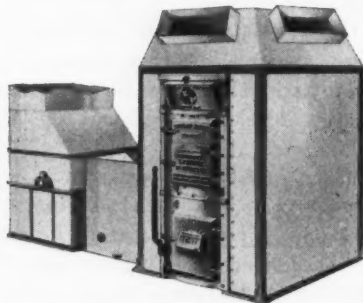
The Torrid Zone Econotrol Buckwheat blower—saves 45% on fuel, gives heat control and overcomes poor chimneys.



The Combination Torrid Zone for warm air hot water. Water backs replace the brick firepot lining.



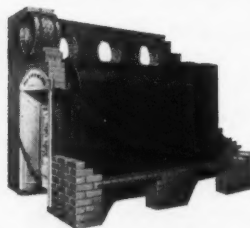
The Heavy Duty Torrid Zone for churches and schools. Made of $\frac{3}{4}$ " boiler plate in three different sizes.



The Torrid Zone Aire-Flo a complete mechanical air conditioning unit. With our simplified installation code any average mechanic can install it with assured success.

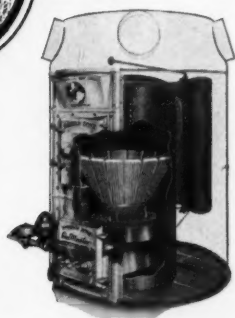


The Heavy Duty furnace with flanges for brick settings. These flanges can be used on all types of Torrid Zones.

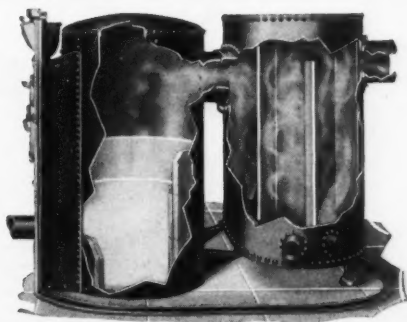


The famous Hercules—one of the largest riveted steel furnaces ever built. Tremendous heating power—two radiators.

Say you saw it in AMERICAN ARTISAN—Thank you!



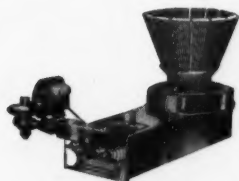
The Torrid Zone GasMaster Automatic Gas Unit—a conversion burner built for Torrid Zone and Equator furnaces.



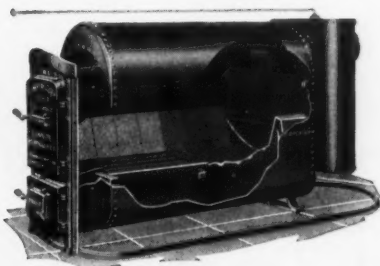
The Oil Conservator for oil burning. The extra radiator makes it one of the most efficient oil furnaces.



The Torrid Zone Gas-Fired furnace with its vertical steel heating surfaces is highly efficient, durable and safe.



The Lennox GasMaster Automatic Gas Unit for all types of furnaces and boilers. Includes automatic controls.



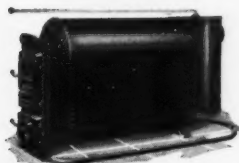
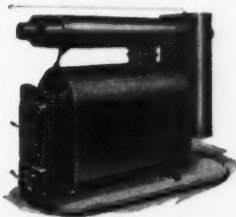
The W. C. Model Torrid Zone for burning long sticks of wood and also for coal. Ideal for rural homes.



The gas furnace heating element showing the heavy riveted steel construction and the six horizontal baffles.



The H. C. Model Equator—the only inexpensive steel furnace built for burning hard coal and coke.



Wood burning furnaces for wood up to 48" lengths. Three different length bodies and combinations of radiators.

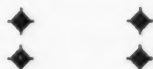


The Standard Equator—a low priced quality steel furnace for smaller homes. Ideal for price competition.

◆ ◆ ◆
THE WORLD'S LARGEST MANUFACTURERS
OF GAS TIGHT STEEL FURNACES

LENNOX FURNACE COMPANY, INC.,

MARSHALLTOWN, IOWA
HAMILTON, ONTARIO



SYRACUSE, NEW YORK
WINNIPEG, MANITOBA

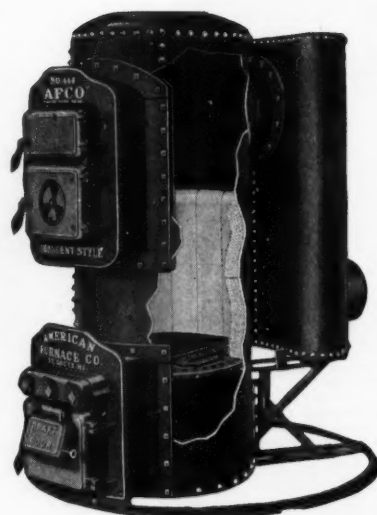
Mention AMERICAN ARTISAN in your reply—Thank you!

Offer a Complete "AFCO" Heating Service

ONE TYPE of furnace can no longer be expected to answer all the heating requirements for which the warm-air system is adapted. Each class of installation requires a combustion unit and air distributing system specially fitted to the needs of the building in which it is to be used.

"AFCO" has made it easy for the dealer to take advantage of the enlarged opportunities for warm-air heating by providing every type of furnace and complete unit necessary to meet these requirements. It offers the surest method of building a successful and profitable heating business.

Hundreds of dealers are now selling a complete heating service, backed by "AFCO" equipment. You can too. Write today for details of the interesting "AFCO" dealer franchise.



**The "AFCO" Crescent
Boiler Plate Furnace**

*One Member in the Complete
Line of "AFCO" Heating
Equipment Which
Includes*

- "THERMO" Cast Iron Furnaces—
(Two Types).
- "AFCO" Boiler Plate Furnaces—
(Three Types).
- "AFCO Duo-Blo" Industrial Unit
Heaters.
- "AFCO De Luxe" Domestic Healthful
Heating Systems.

*Other Furnaces Come and Go
"AFCO" Stays and Grows*

American Furnace Company

2719-31 Morgan Street

St. Louis, Missouri

Say you saw it in AMERICAN ARTISAN—Thank you!

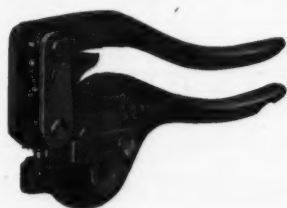
Larger Bearing Surface

HYRO UNXLD**DAMPER
QUADRANT**Redesigned
Frame →Malleable
Iron Handle ↗

**HYRO MAKES
A COMPLETE
LINE OF OTHER
DAMPER ACCESSORIES
ALSO**

No. OX METAL PUNCH

A small, strong punch for 14 gauge sheet metal and lighter. Measures 8" over all and weighs 2½ lbs. The most powerful punch of its size.

**SHUR-**

**GRIP
SOLDER IRON
HANDLE**

This is the *different* solder iron handle. It *screws* on, cutting its own thread on the stem of the solder iron. Can't split or come off. Has an air vent that prevents heating and scorching.

THE damper regulator is just as important on a heating or ventilating job as the throttle on an automobile. If it works loose, doesn't show the position of the damper from the outside—in short, if it doesn't control the passage of air accurately—it is a reflection upon your skill and a handicap to your profits.

Avoid damper kicks by installing Hyro UNXLD Damper Quadrants on every job. Architects, heating and ventilating engineers, contractors—all who have anything to do with dampers—agree that the Hyro UNXLD is the best damper trouble insurance.

Hyro UNXLD Damper Quadrants are built *right*. The malleable iron handle can be locked in any position on the indicating scale by a twist of a wing nut. The carefully made frame, designed for a maximum of strength and a minimum of weight, is installed with equal ease on both flat and curved surfaces.

UNXLD comes in five sizes to take care of the smallest as well as the biggest jobs. For further details and prices send in the coupon.

HYRO
MFG. CO., Inc.
202 VARICK STREET
New York City

Mail this coupon today for prices and full information

Hyro Manufacturing Company, Inc. 4-31
202 Varick Street, New York City.

Please send me prices and details about

(Please check)

Damper Accessories ☐

Metal Punches ☐

Shur-Grip Handles ☐

All Products ☐

Name.....

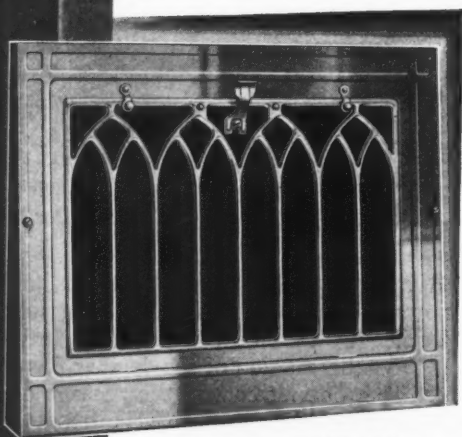
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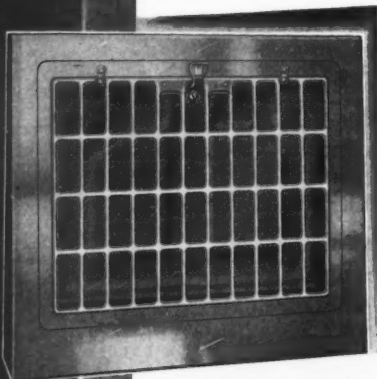
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Mention AMERICAN ARTISAN in your reply—Thank you!

STANDARDIZE *on* the line that gives you DEFINITE *selling* advantages *vvv*



No. 110 Series, two-piece register. Size 8x12 has full capacity for 10" pipe. Sidewall register and baseboard cold air intake to match.

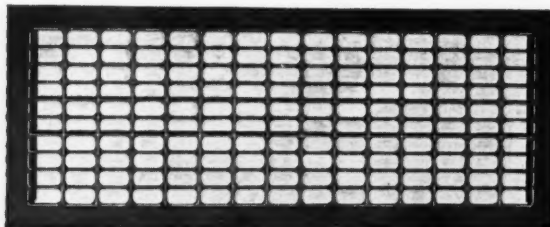


No. 150 Series, two-piece register. Also made in one-piece type, No. 160.

IF you'll just stack an H & C register alongside any of its competitors we'll wager that you will readily observe why it pays to confine all your register requirements to this one reliable line. Your first impression is that the H & C register is decidedly more attractive—better made throughout, with more careful attention paid to every detail of design, construction and finish. Then compare the relative air capacities. On this score, and it's an important one, H & C registers by virtue of their patented "pinched back construction" lead by a big margin.

These superiorities are quickly grasped by the prospective furnace purchaser. They constitute a real selling advantage on which many live-wire dealers are capitalizing—an advantage that actually costs nothing, for H & C registers cost no more than others.

The complete line contains a style and type best suited to every purpose. Handled by leading jobbers everywhere.



No. 255, the original special cold air face and still the best. Furnished in black japanned, oxidized copper and medium shade of oak best suited to all oak floors.

HART & COOLEY REGISTERS

— THE AIR CAPACITY LINE —

MADE BY HART & COOLEY MFG. CO.

CHICAGO—61 W. Kinzie St.

NEW BRITAIN, CONN.—Corbin Ave.

Philadelphia, 1600 Arch Street—New York, 101 Park Avenue—Boston, 75 Portland Street—Nashua, New Hampshire

Factories at Holland, Mich.—New Britain, Conn.—Nashua, N. H.

Also a Complete Line of

FURNACE REGULATORS, CHAIN, PULLEYS, DAMPERS, and the H & C Automatic HEAT CONTROL

Say you saw it in AMERICAN ARTISAN—Thank you!

SELL WARM AIR HEATING

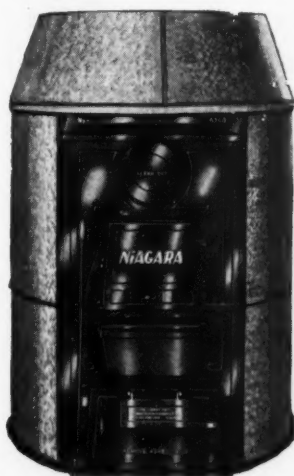
It's the most satisfactory system money can buy...



THAT'S what everybody is looking for. Plenty of healthful heat with a minimum of effort. The Niagara Warm Air Book presents this argument in its own forceful way. Use the Book to sell Mr. and Mrs. Jones.

They are too busy to become human stoking machines. The New Niagara is the busy person's delight. In ordinary weather it requires only a few minutes' attention out of the 24 hours. During the day Mrs. Jones merely reverses the chains on the first floor. And yet abundant, clean, moist heat is an easy matter in the coldest weather.

Mr. and Mrs. Jones don't even need to fill the humidifier—you can hook it up with the water system. And you can recommend several other automatic features which reduce busy people's furnace work to just about nothing at all.



The live warm air furnace dealer can vastly increase his profits by selling an automatic humidifier, automatic stoker, a control thermostat, a fan, and automatic air washing and purifying along with the New Niagara. We'll be glad to give you full details along with a Niagara Warm Air Furnace Book. Mail the coupon.

We carry at all times a stock of repair parts *made from original patterns* for all Niagara and Monarch Furnaces, and shall be glad to furnish quotations. We manufacture the well known Walworth Registers, and are in position to serve you promptly.

THE FOREST CITY FOUNDRIES COMPANY
2500 West 27th Street Cleveland, Ohio

HEALTHFUL HEAT
NIAGARA
WARM AIR FURNACE



FOREST CITY FOUNDRIES CO.
2500 West 27th St.
Cleveland, Ohio
Send your Niagara Warm Air Furnace Book.

Mention AMERICAN ARTISAN in your reply—Thank you!

*Save 25% to 35% in
Installation
Time*



Each size of AGRICOLA "Supreme" has a greater heating capacity. For example: the 24-inch size rates 645 sq. in., standard code rating.

Agricola "SUPREME"Years ahead of other furnaces

SIMPLICITY is the keynote in AGRICOLA "Supreme" construction. Its sweeping improvements in design, far in advance of present furnace practice, actually mean a 25% to 35% CUT IN INSTALLING TIME.

Five or ten years hence, other furnaces may boast S-O-M-E of these features. But right now—as a money maker and goodwill business builder—AGRICOLA stands "SUPREME," and we can prove it to you.

Why not write or wire for complete details? You'll find our proposition convincing.

AGRICOLA FURNACE CO., INC.
GADSDEN, ALABAMA
Offices in Principal Cities



Say you saw it in AMERICAN ARTISAN—Thank you!

The "Barnes" Super Elbow

Stand on one and test its strength



**WHERE
Quality
Counts**

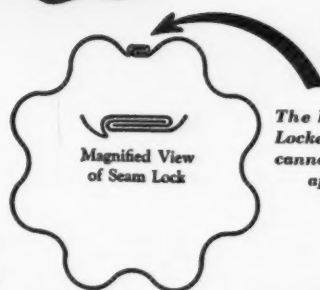
**Barnes
is
First
Choice**

HEAVIER—STRONGER

...yet cost no more than the ordinary elbow

Send for a sample

THE Barnes locked seam as used in Elbows and Conductor is an exclusive Barnes feature. Being on the outside curve of the Elbow, it insures greatest strength and rigidity.



Magnified View
of Seam Lock

*The Barnes
Locked Seam
cannot come
apart*

USE

Barnes

PRODUCTS

TO

BUILD

BETTER

BUSINESS



Cut this Barnes Conductor Pipe any place. It won't split. The lock-seam is your guarantee.

BARNES METAL PRODUCTS COMPANY

4425 W. 16th Street

Manufacturers of

Chicago, Illinois

Conductor Pipe, Elbows, Eaves Trough and Fittings. All Sizes, All Metals

Mention AMERICAN ARTISAN in your reply—Thank you!



The Weir "DeLuxe" Casing Is Much More Than Just a Square Metal Box!

It wasn't merely "designed"—it was **ENGINEERED!**

Its "free-air" area was determined by engineering standards to the correct proportions, so that the warm air will be exactly distributed around the heating surfaces.

The insulating spaces between the inner and outer walls decrease unwanted radiation in the furnace room.

The casing has the further advantage of high speed assembly. Just four sections ready-made to go together **QUICK** without the use of bolts or screws.

Beauty? Of course—an attractive royal-blue lacquer finish that does not burn off and which can be washed and cleaned when desired.

Drop Us a Request for Full
Information About the New
WEIR Conditioned-Air Unit.

**THIS WEIR IN ITS NEW "DRESS"
IS ADMIRABLE EQUIPMENT IN HOMES
WHERE THE BASEMENT HAS "GONE MODERN"**

▼

THE MEYER FURNACE COMPANY
PEORIA, ILLINOIS

Say you saw it in AMERICAN ARTISAN—Thank you!

**"The way to success is no secret...
dependable workmanship and materials,"**
says JOHN NIEHAUS, St. Louis



John Niehaus, partner in the firm
of Wand & Niehaus, St. Louis.



Marquise of the Hotel Lennox, St. Louis. 2,500 lbs. of Anaconda Copper, supplied by Hammond Sheet Metal Co., distributors... fabricated and installed by Wand & Niehaus. P. J. Bradshaw, Architect.

WAND & NIEHAUS, successful contractors of St. Louis, Mo., have found from experience that Anaconda Copper has been helpful to them in their business. Mr. John Niehaus writes:

"We believe that satisfied customers are our greatest asset, for we have found that the opposite of the old saying 'Bad news travels fast,' is also true. Since we started to use Anaconda Sheet Copper exclusively, we have not had a dissatisfied customer, and our reputation for doing good jobs has spread all over town. The way to success is no secret—dependable workmanship with dependable materials is the only formula we know."

Throughout the country, progressive sheet metal contractors, who are building reputations and making money, find, like Wand & Niehaus, that it is good

sound business to combine quality workmanship and Anaconda Copper.

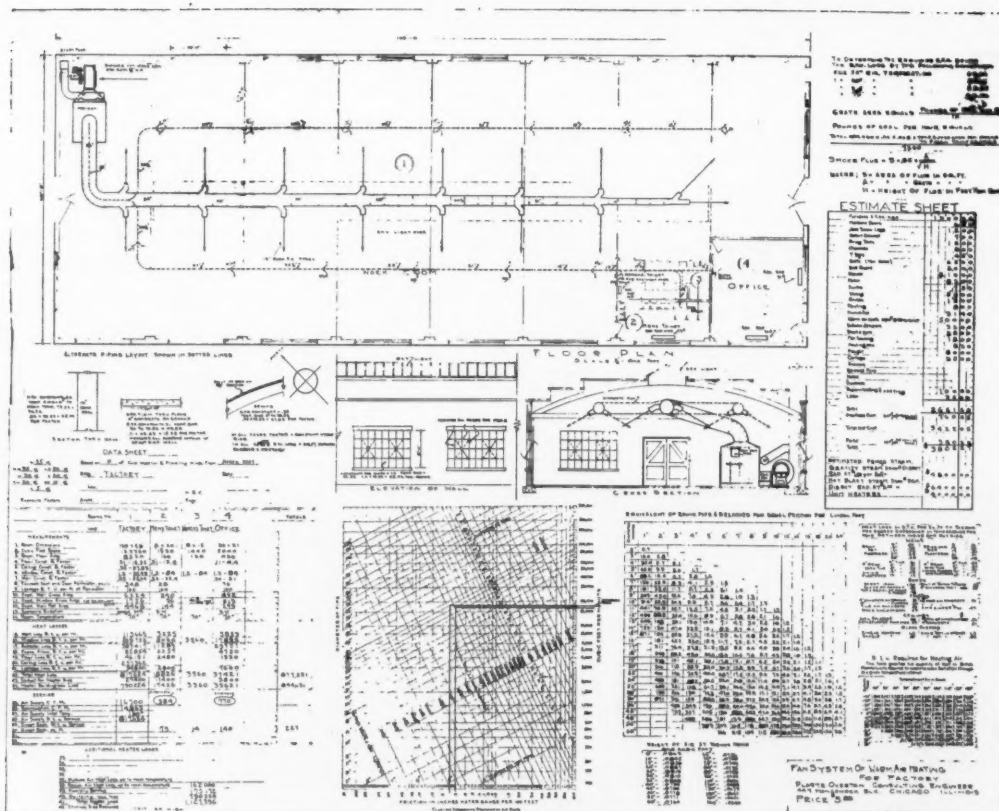
Anaconda Copper in the form of sheets, rolls and Economy Strips is stocked by leading distributors, assuring prompt deliveries to all sections of the country. The American Brass Company, General Offices: Waterbury, Connecticut.

Many fine copper jobs have come from this shop.



ANA CONDA COPPER

Mention AMERICAN ARTISAN in your reply—Thank you!



NOW with this help you can handle the *BIG* heating contracts

IF you are a live progressive warm air heating and sheet metal contractor, and if you have been passing up the Big Fan Blast Warm Air Heating jobs because you lacked the proper *engineering* information to tackle this type of job, here is data that you have been waiting for.

This service, which consists of complete plans and engineering information, won't make you an engineer, but if you know how to read plans, charts, graphs, and tables and know how to figure grate areas, heat losses, pipe sizes, etc., *when you are shown how with complete data and correct formula*, you will realize the great value of this information and be able to use it profitably.

The plan illustrated above (greatly reduced in size) is that of a Fan Blast Warm Air Heating installation in a *factory*. All the information necessary for you to figure a similar installation for a larger or smaller factory is given right on the full size plan.

Plans, specifications, material and cost estimates, instruction sheets, description of system design, etc., showing installations in *Church, School, Theatre, Garage and Residence* are also available. Each plan is complete with charts, graphs, tables and heat loss data sheet. Methods for sizing ducts, mains and branches are given together with data for determining grate area, smoke flue area, fan and motor requirements.

ENGINEERING PLANS for FAN BLAST Warm Air Heating and Ventilating

THESE plans and accompanying data were prepared by a well known Fan Blast Warm Air Heating and Ventilating Engineer. Live contractors who can apply this information can use it to land the big jobs that come up in their community. The Schools, Churches, Factories, etc., in your town should be heated by *Warm Air* and these plans open the way for you to get the business.

Send the coupon for further information

Book Department

AMERICAN ARTISAN
139 N. Clark Street - Chicago, Illinois

AMERICAN
ARTISAN
139 N. Clark St.
Chicago, Ill.

Send me more information and prices of
PLANS for FAN BLAST
WARM AIR HEATING AND
VENTILATING.

Name.....
Address.....
Town..... State.....

AN EXPRESSION OF CONFIDENCE

Just two years ago, the Armstrong Furnace Company moved into its new plant in Columbus, Ohio. Twice the capacity of the old one and every facility for economical and efficient production of boiler plate furnaces were made available by the new buildings.

The erection and equipping of these new buildings sprung from confidence in the future. That confidence has never wavered. We have confidence in our future because we have confidence in the future of our customers, now numbering twice as many over two years ago.

It is said a man is known by the company he keeps. So it is with a business organization. We hold that our customers number among the very best in the trade.

We believe the dealer's interests are best served by holding to his present line, granted he is buying from a dependable, permanent, well managed company and there are many, Armstrong included. Switching to new lines through lower prices is usually detrimental. Hold fast! Remember only what is good for both buyer and seller is good, indeed.


Inquiries Solicited


ARMSTRONG FURNACE CO.

Makers of Armstrong Boiler Plate Furnaces

COLUMBUS, OHIO

Say you saw it in AMERICAN ARTISAN—Thank you!

Founded 1880

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNALCovering All Activities
INGravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

There's an article in this issue, the leading story, by the way, which gives some facts about a situation a lot of us are going to face before long. This is the problem of making money off gas furnace replacements sold by the gas company. Hunt Brothers have turned the trick.

* * *

One of the most interesting developments in sheet metal is well under way now in Chicago, where the buildings of the 1933 Exposition will be practically all metal. Metals are being used in a new and revolutionary manner. Many architects claim these buildings portray future building construction.

* * *

This issue contains the first of a short series of articles by L. W. Millis dealing with facts every salesman of gas equipment ought to understand before he is qualified to do a selling job. If you are interested in gas furnaces you will want to follow these articles.

VOL. 100, NO. 8

APRIL 13, 1931

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JOSEPH D. WILDER
Editor

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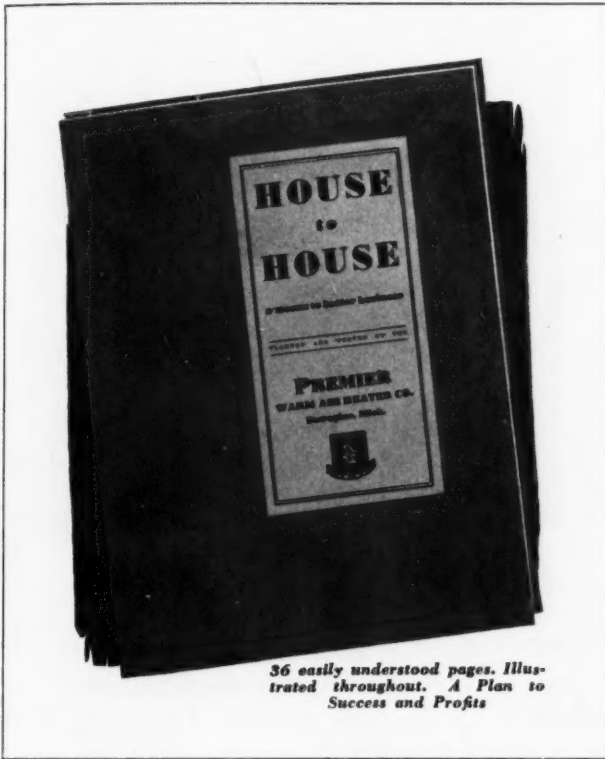
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HOUSE to HOUSE

1931 Edition NOW READY!



Do you want more business? Are you willing to spend 50c for a SURE-FIRE plan to get more business?

If you want more business and want to know *how* to get it, you will want a copy of Premier's big new 36 page booklet entitled HOUSE to HOUSE. HOUSE to HOUSE outlines a canvassing plan that is GUARANTEED to get results. This new Premier booklet tells you how to plan your canvass, what to say to get into the basement, what to say to sell a cleaning or reset job, how to sell the repair or new furnace job that is uncovered by the cleaning or reset job, also suggests advance letters, handbills, newspaper advertisements and many other helps to make your canvassing more successful. If you are a believer in house to house canvassing, let HOUSE to HOUSE show you how to get better results.

If you are NOT a believer in house to house canvassing, read HOUSE to HOUSE and be sorry that you have not canvassed before. This booklet is FREE to Premier Dealers—there is a charge of 50c to dealers NOT Premier Dealers. Only a limited number of copies remain—first come, first served. Order TODAY to be sure you get YOUR copy. Use the coupon below.

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PLEASE PRINT NAME AND ADDRESS PLAINLY

P. S. Postage is prepaid.

Mention AMERICAN ARTISAN in your reply—Thank you!

A Startling / Development

LAN SING SAV-OIL FURNACE

DAIL
DEPENDABLE

"Captures the Heat Units"

Just the unit / the modern heating man has been • looking for — a furnace designed to give maximum heat with the lowest possible fuel cost.

The Lansing Sav-Oil will operate on oil fuel at approximate cost of soft coal, and an equally interesting saving on gas.

If you want the most modern heating system for your trade, investigate the Lansing Sav-Oil Furnace *now*.



Front View—Casing Cut Away

**OIL
or
GAS
BURNING**

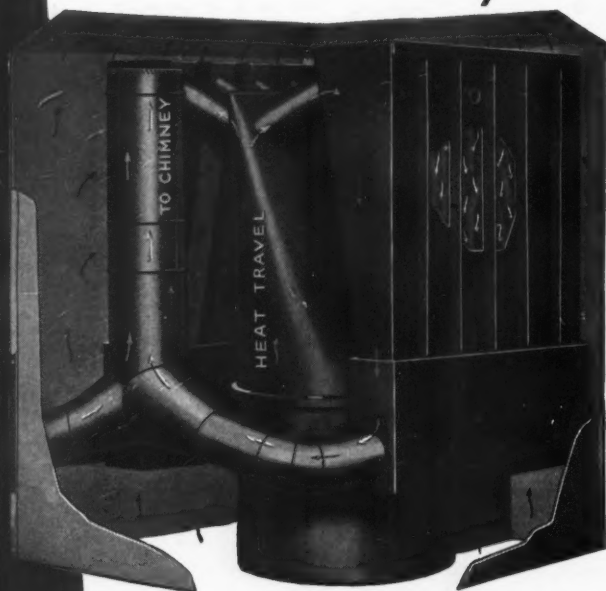
The front view illustration above shows the special rock wool blanket feature of the Lansing Sav-Oil Furnace—This feature alone saves many dollars in fuel cost.

The white arrows in the left hand cut represent gas travel and black arrows air travel.

It's the air scrubbing the large radiating surfaces that makes the Lansing Sav-Oil stand in a class by itself on fuel economy.

The Lansing Sav-Oil Furnace is not an experiment; it has been thoroughly tested under actual home heating conditions for 2 years.

*Write today for complete
data and dealer
proposition*



Rear View—Patents Pending

DAIL STEEL PRODUCTS CO.
1050 MAIN STREET **LANSING, MICH.**

Say you saw it in AMERICAN ARTISAN—Thank you!

Some More—"Convection Heating"

IN the March 16th issue, we offered the suggestion that there was pressing need today for some term which adequately describes our type of heating. And that this term should be scientific enough to arouse the curiosity of prospects and at the same time keep as far away as possible from all reference to "hot air" heating.

Just to start the argument along we offered our suggestion that the term Convection Heating describes our type of heating according to all rules of Hoyle, the dictionary and science.

In making the suggestion for Convection Heat we did not expect that the response would be immediate, since the term is one which must be mulled over in the mind and rolled around on the tongue until it fits. But seemingly a whole section of our readers took the term and tried it out on prospects just to see what it would do.

The results as expressed in letters received have been surprising. The term seems to have gone over nicely and aroused the curiosity of the buying public. We would like to cite and show all the letters received telling us about the use of the term. Space will not permit, but here are a few, chosen at random from various parts of the country.

One contractor in St. Louis has been working on a tough customer for several months. This customer owns a string of houses and is periodically in the market for repair and replacement work. Just a short time ago, he began to plan a house for himself. But he didn't want any of that "hot air" stuff in *his* basement. And he couldn't be told anything, either.

He dropped into the heating man's office a few days ago and just to experiment, the heating man began to talk about convection heat and what a wonderful system it is. The customer wanted to know the details, but the contractor would not say other than that in this system the air was circulated, impurities cleaned from the air, humidity was controlled summer and winter and, of course, heat provided.

The customer wanted to know what sort of a plant was used and eventually was told how the system used a heater for warming the air, a washer for cleaning

and humidifying the air, gas for fuel, and every room controlled by an individual thermostat if desired. That customer wants that system. And he hasn't anything to say about "hot air."

Down in the southeast, the Georgia Plow and Foundry Company sends us a blue print which forms the first sheet of every heating layout submitted to customers. Right up at the top of the sheet, in big, bold lettering is the caption Convection Heating and Air Conditioning System. This firm says that their prospects seem to like the term and to be impressed by it. The term is tied up with the heating plant by showing a phantom view of the system.

The Thomas Sheet Metal Company, Lewistown, Pennsylvania, writes that they think the idea is fine and that something should be done to kill "hot air." And in Cleveland the Henry Furnace and Foundry Company writes that they "second the motion" on a new term. The company says that perhaps Convection Heat will not be the term finally chosen, but that something should surely be done to insure the death of "hot air" talk and ideas.

Last week we talked to a contractor out in Kansas who operates in the center of the gas country. This contractor's town is infested with heating systems costing installed from \$99.50 to \$135.00. If that isn't low price, we haven't seen a cheap installation.

Anyway, this contractor is hard at work getting away from such competition and trying to break open the expensive house field. Just before we called on him, he had interviewed two prospects building \$20,000 homes and talked to them about Convection Heat. Not until he was ready to leave did he show the prospects what sort of equipment he was offering, but we hear by mail that he has signed both contracts and that every essential piece of equipment will go into the jobs.

If space permitted this issue, we would like to cite a whole lot more of the letters received, but they must wait for another issue. Our regret is that more of you haven't written in and given us your suggestions for a new name. There surely must be some other ideas—perhaps better than ours. If you have one you use to advantage let us hear about it.

HOW HUNT BROTHERS MERCHANDISE

Gas Furnace Replacements

In Kansas City the gas company sells most of the gas furnaces. Hunt Brothers is one of two firms making the installations. But they were not satisfied to merely replace the furnaces and have worked out a merchandising plan to sell fans, blowers, trunk line systems and additional warm and return air leads and outlets

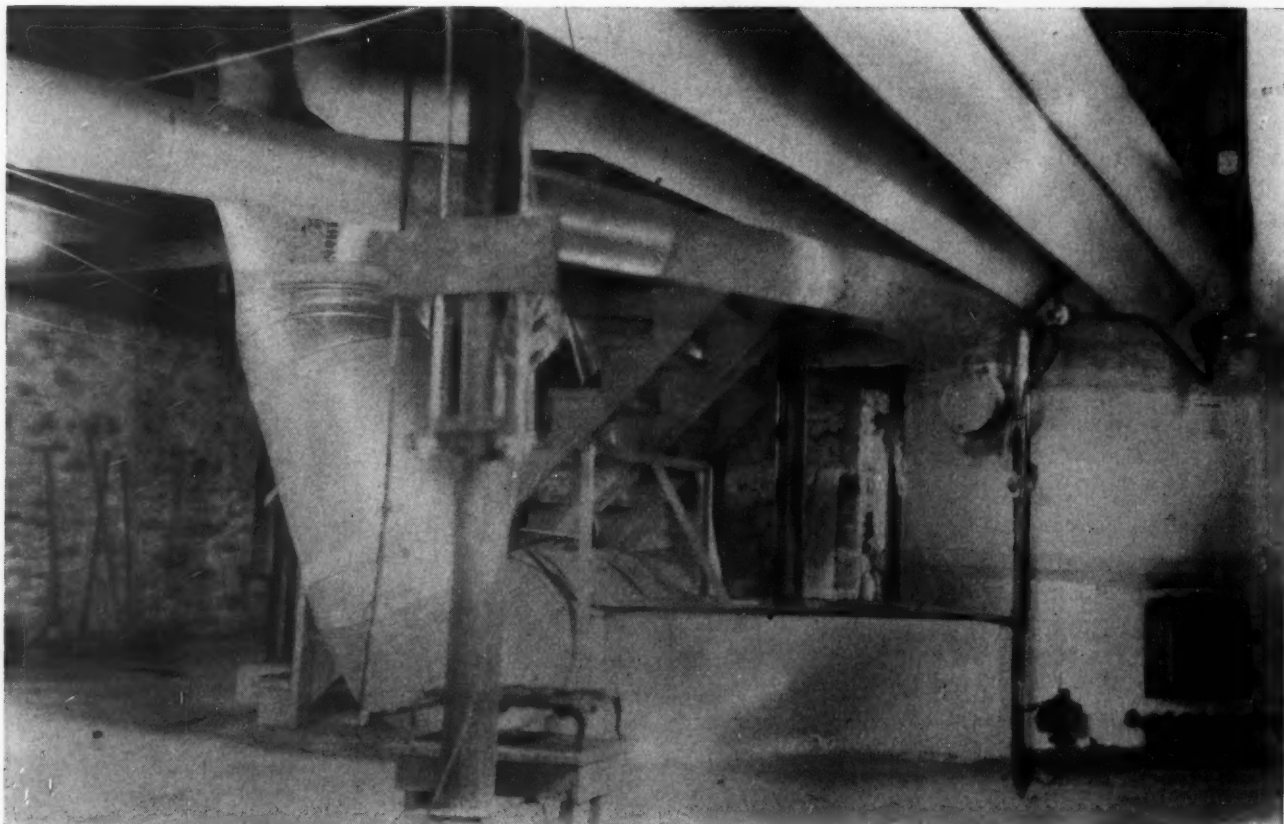
IN Kansas City the introduction of natural gas has brought about a vast increase in the use of gas as a house heating fuel. The natural result is that hundreds of gas furnaces have been installed, replacing worn-out furnaces and also as replacements in homes where the owner wishes automatic heat.

In this city the local gas company sells most of the furnaces. Home owners are permitted to buy a gas furnace on their gas bill, paying a small amount down, with the balance extended over a period of from one to two years, depending

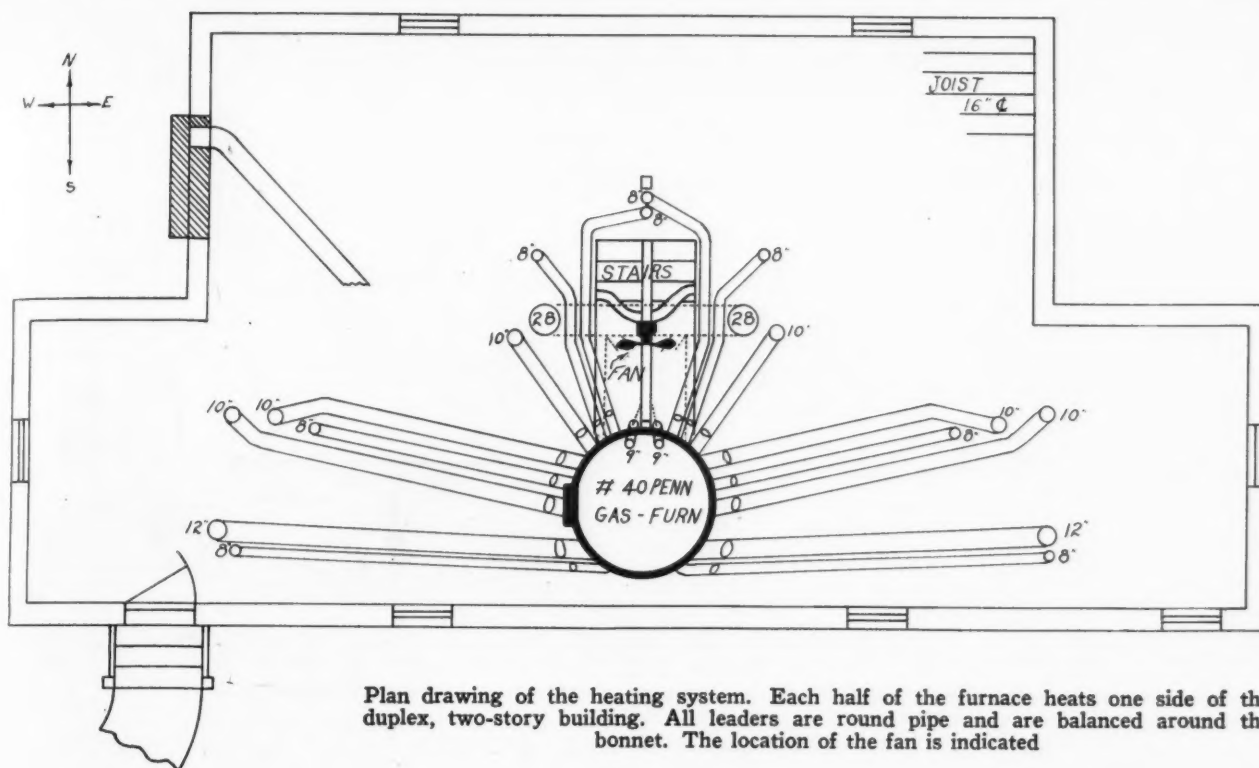
on the amount of unpaid balance. Interest is charged for carrying such accounts.

When the gas company first began to sell these gas furnaces, practically every warm air heating contractor in Kansas City did work for the company. But this did not prove satisfactory, because with so much competition a whole lot of poor workmanship was done, with the result that the gas company, assuming the responsibility for the operation of the installation, found itself faced with high service costs.

In the end the city was roughly



This side view of the installation shows the front of the gas furnace with its control and the return air boot into which the two large return air pipes connect. The fan is housed in the circular section at the base of the pipes



Plan drawing of the heating system. Each half of the furnace heats one side of the duplex, two-story building. All leaders are round pipe and are balanced around the bonnet. The location of the fan is indicated

divided into two sections and in each half of the city one responsible warm air heating contractor was chosen to do the installation. This system has worked out to everyone's satisfaction.

One of the two contractors now operating under this plan is the Hunt Brothers company. Years ago the father of the present three boys in the firm conducted a combined hardware and heating business, but turned over the heating end of the business several years ago to the boys and now runs only the hardware store.

Since Hunt Brothers began installing gas furnaces they have erected dozens of furnaces a year. As can be imagined, much of their work consists of merely taking down the old furnace and placing the new gas furnace over the same spot and connecting the return air and warm air leaders to the new bonnet.

But the Hunt brothers have not been satisfied to take such replacement work without trying to show the home owner what additional improvements can be made while the replacement work is under way.

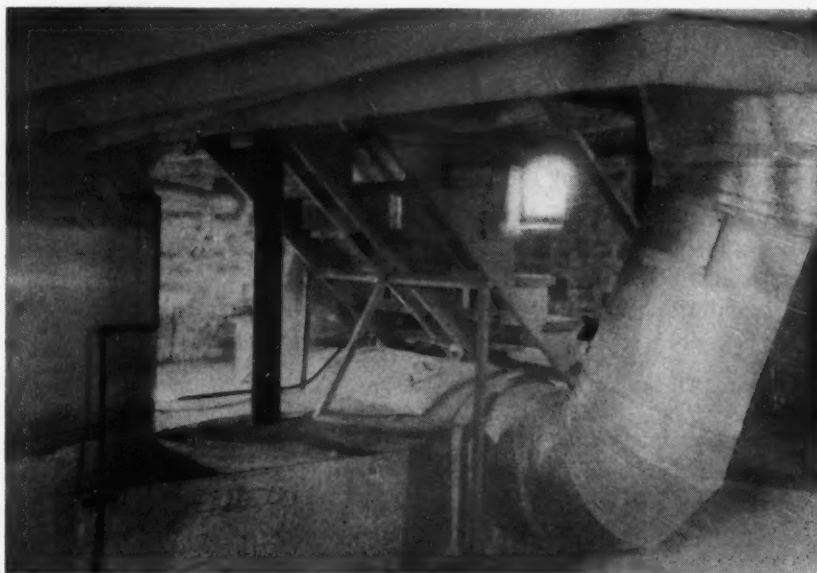
For instance, scores of these jobs

are short of return air. This seemed to be a typical fault of the installations made several years ago and resulted from efforts to cut costs and also careless design. So on every job which the firm does the warm air and return air sides of the system are carefully checked against Standard Code, and in more than one-half the houses additional return air is recommended.

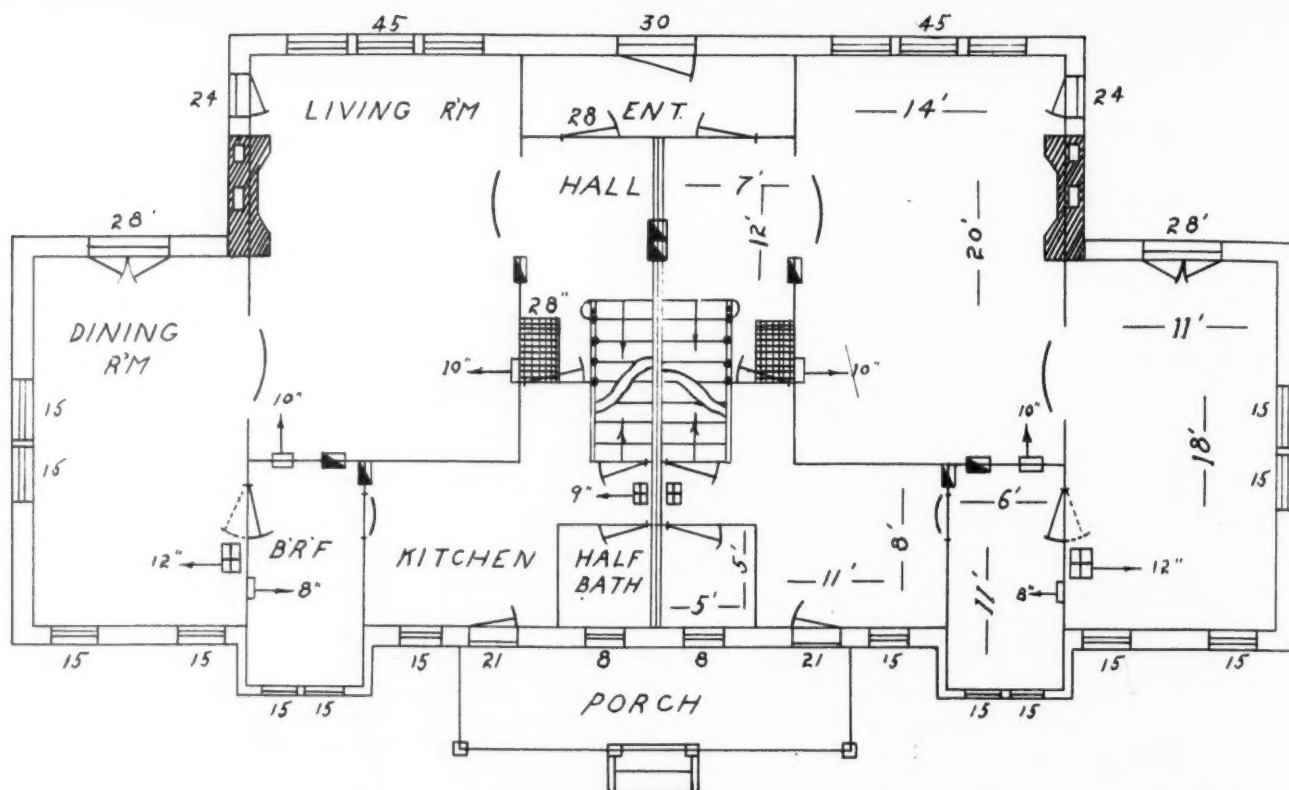
This same checking against Code also discloses frequently that an

additional warm air run, or a larger leader or stack and register, will provide additional heat in rooms which may be cold on bad days. Such additions are brought to the owner's attention and costs of such work are given.

Another improvement which the Hunt brothers have worked out is the use of forced air on these jobs. They explain to the owner that so long as a new furnace is being installed it is a good time to give



One of the basement posts stands in the center of the return air boot, which is split around the post. The door with the handle opens into the fan chamber



This is the plan for the first floor. One large return air grille serves each side of the duplex. Note the duplication of registers

some thought to rearrangement of the heating system in the basement. It is explained that through the use of a blower or a fan the furnace can be set over in one corner, out of the way, and with rectangular ducts practically all the headroom of the basement can be used and the freed spaces used for recreation rooms, or other activity.

This excellent salesmanship has resulted in dozens of replacement jobs adopting forced air with such extra equipment as a fan or blower and trunk line system.

The plans and photographs on these pages show one interesting job recently completed by the Hunt company. This house is a duplex with each family occupying two floors. The house is frame with shingle exterior. Each side of the house has eight rooms, with three bedrooms and a bath on the second floor.

There is an interesting story connected with the house. The owner wanted warm air with a fan system, but the contractor who put up the house was a strong advocate of hot water and related all the usual stories about a furnace system. In

spite of the contractor the owner stuck to warm air and selected automatic gas as the most convenient type of system.

The basement plan shows that the leads for the two sides of the house were taken off the furnace pretty well divided around the bonnet. All these basement leaders are round pipe with a single asbestos paper covering. Each leader has a damper close up to the bonnet, but the system works with only a few dampers set off full open. Some of the runs are quite long, but with the fan this does not matter.

One of the interesting things about this plant is its location. The large basement is used by both families, and of course it was not desirable to place the furnace in either one or the other halves, so a position right under the stairs was chosen. This did not create any difficulty on the warm side of the plant, but did necessitate an unusual steer-horn arrangement for the return air.

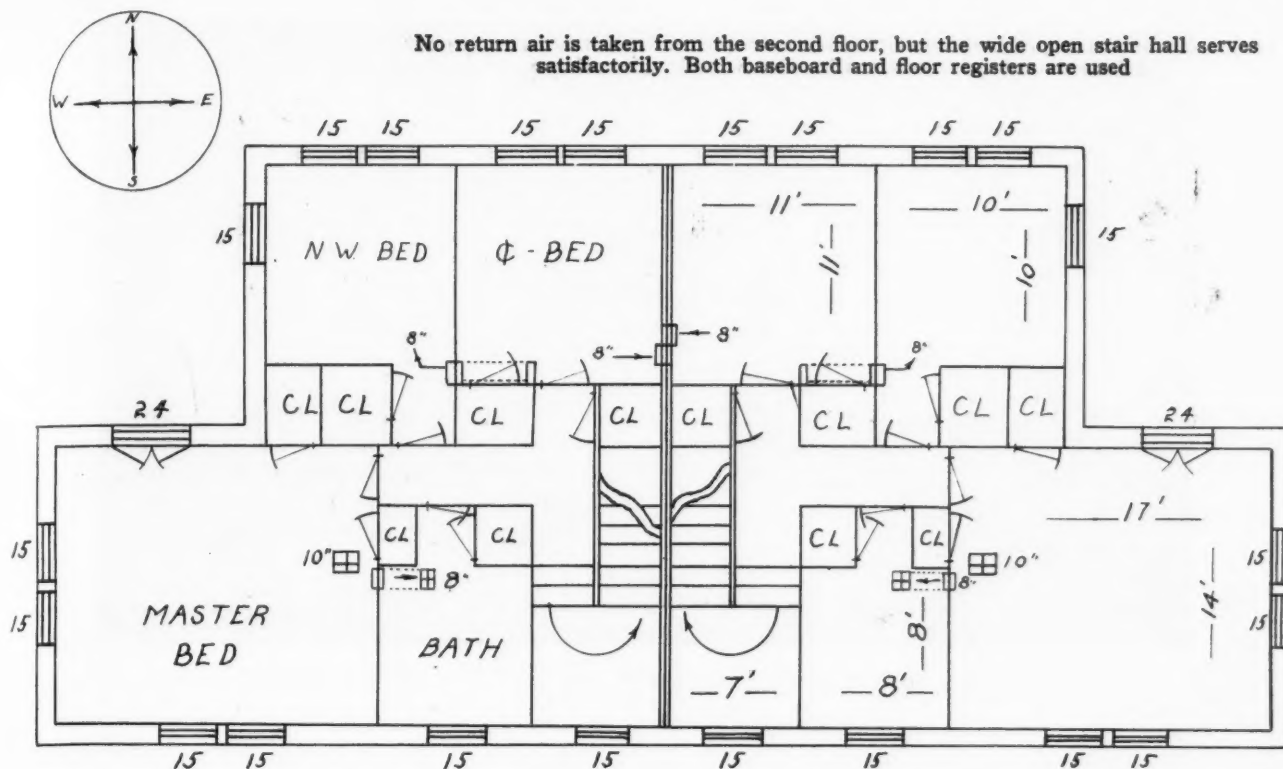
Return air from the house is taken from one large grille placed in the floor of the downstairs hall right at the foot of the stairs. The

basement stairs are directly under the main stairs, so the two 30-inch round return pipes were dropped out of the grille and sloped but slightly to the basement floor. The basement stairs, as shown in one of the photographs, pass right between these large pipes.

The result of this arrangement is that the basement is free for use and the two return air pipes are short, straight down and entirely out of valuable space.

The picture of the basement shows a cast iron post in the center of the return air boot. The boot was split and passes around the post and becomes one duct again at the casing.

The fan used in this system is a number 1500 Miles using the louvers for gravity by-passing. The fan housing is the large circular portion of the boot under the steps. A slide door permits examination and oiling when necessary. There are two speeds provided—the low speed being used in winter for heating and the high speed for summer cooling. A manual control in the owner's kitchen permits the fan to be turned on or off in the summer.



The burners and the fan are controlled by a first floor thermostat located in the living room of the west house and by a bonnet control on the furnace. The burners come on and go off at the signal from the thermostat while the fan goes on and off as the temperature inside the casing dictates.

In figuring the sizes for the pipes and stacks, the Hunt brothers used

a modified Standard Code basis. Square feet of glass and net exposed wall and cubic contents are figured according to the Code, with additional loss for directional exposure added. Then for both first floor and second floor the factor 6 is used to get the leader size.

For instance, in the living room and hall, which are both heated from one register, the area of glass

is 69 divided by 12, giving 5.75. The net wall area is 135 divided by 60 to give 2.25. The cubic content is 2280 divided by 800, giving 2.85. The total for the hall is 4.10. Multiplying these by the factor 6 gives 89.70. An additional 15 per cent is added for exposure, making a total of 103.80. To heat this two 10-inch leaders are used. Registers are both floor and baseboard types.

Washed Air Proves Better Than Doctor

Contractors who are looking for new sales angles to use on prospects capable of buying heating systems using forced air and washers will be interested in this unsolicited letter recently received by Schmidlin Brothers Company of Toledo, Ohio.

As the letter states, the writer found comfort and relief from asthma in a home equipped with a gas fired, forced air heating plant passing all the air through an air washer.

Here is the letter:

March 11, 1931

The Schmidlin Bros. Co.

Toledo
Ohio

Dear Sir:—

During the Xmas holidays, I was visiting my sister and husband, Mr. and Mrs. G. L. LaBoiteaux of Hall Prairie Rd. near Perrysburg, Ohio. I would like some information regarding the heating plant and washed air system which you have installed in their home.

I have been a sufferer from

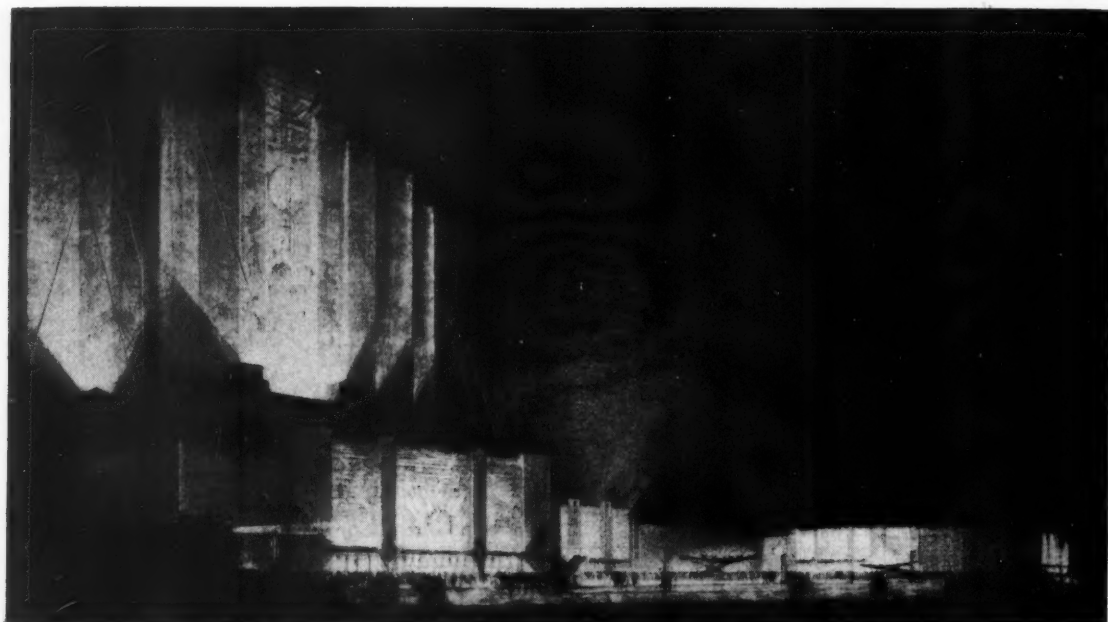
asthma for years, especially in the winter, and while visiting my sister was entirely free from asthma and coughing.

My sister who was with me also noticed a great relief from catarrh, with which she is bothered. We attribute this to the clean pure air, and new method of heating.

We would be glad if you could furnish us with some literature concerning it.

Yours very truly,

Clara Brown.



Artist's rendering of the Travel and Transport building lighted at night

METAL—Material of the Future— Dominates Chicago's Fair Buildings

MOST of the country has heard that Chicago will hold a Century of Progress exposition in 1933. And many of the country's newspapers and technical magazines have carried items showing the architecture of the buildings which will house the exhibits. It is well known, too, that these buildings represent in their architectural design radical departures from present or past architecture and construction.

To us it is of highest interest to note that the whole scheme—architecture and construction—is based upon a new handling of materials and the use of materials which

architecture contemplates for the buildings of the future.

These buildings are mostly of metal and glass. Their basic idea is construction lightened and reduced in cost so that our future buildings will be erected for less money.

On the buildings of the exposition, naturally, many savings in cost have been effected that will not be followed in the future. This reduced cost has been countenanced because the buildings will only serve until the closing of the exposition when most of them will be torn down.

So far the administration build-

ing, a replica of old Fort Dearborn, and the Travel and Transport building have been erected. The first two are completed and exterior work is rapidly drawing to a close on the third.

It is this third building that contains much of interest for the sheet metal contractor. The building as it stands uses three principle materials—metal, glass and fibre board. By far the greatest part of the material is metal and it has been used in many forms and in many places, several of which are unusual, but indicative of future construction.

The Travel and Transport building will be one of the largest struc-

The Travel and Transport building is the first exhibition building erected for Chicago's 1933 Century of Progress exposition. It is a metal, glass and fiber board structure ornamented with bright colors and thousands of lights.

Many say it depicts our future structures



tures of the exposition. The main unit is 976 feet long by 146 feet wide, while the tower is 192 feet across. The main building is composed of three units—a large 80-foot center unit with a lower section at each end. Connected to this main structure at a point just off

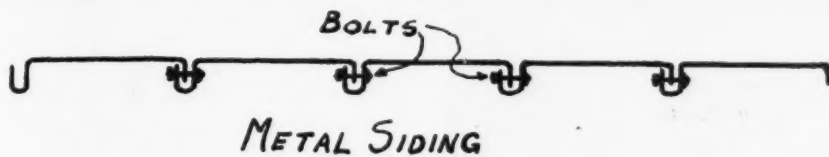
middle section and the unusual trusses which are really combined columns and buttresses for the tower.

Ordinary purlins are tied across the members of the frame with provision to fasten metal to the exterior and insulating board to the

inside. That combination—metal on the outside and board on the interior—is all there is to the walls of this building.

This metal, which is used on the exterior, is something new. It is known as siding and is formed from 20 gauge metal. Each unit consists of a channel shaped section with a lock lap on one edge. For this building the units were rolled in sections as long as 80 feet and were erected in one piece or with two or three units locked together on the ground and raised like structural steel into place.

One of the details shows a cross



This shows how the metal siding is held together

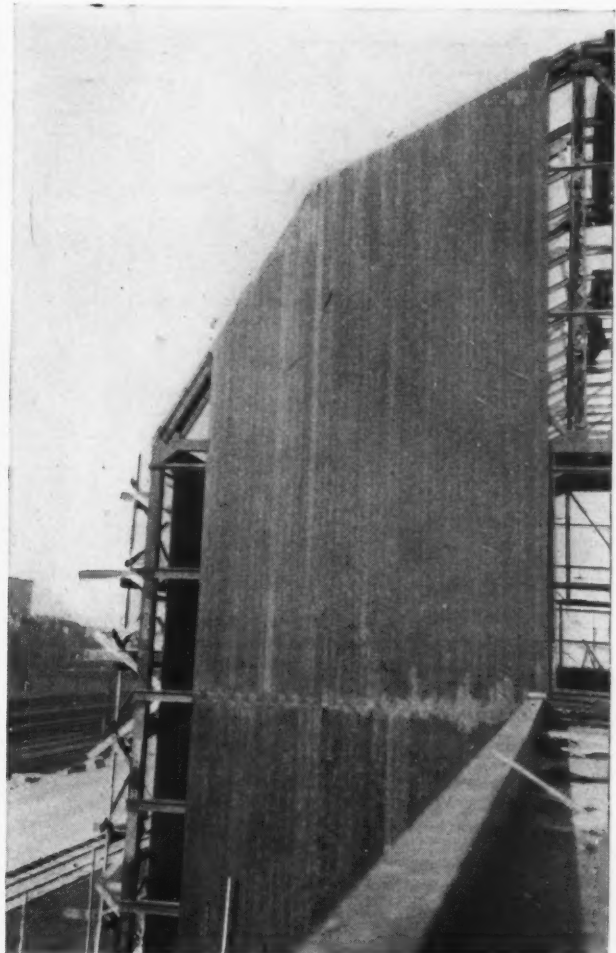
center is a huge tower rising 165 feet into the air. This combination building will house the exhibits of travel and transportation.

The first thing of interest is the exterior of these buildings. The frame is structural steel of regular columns, girders and beams, excepting the large trusses of the

How the siding appears when viewed from straight ahead. Some of the pieces are 80 feet long. The pieces are clipped to purlins



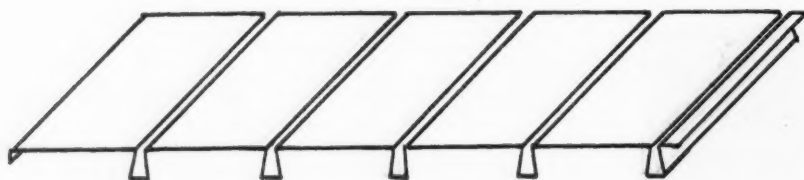
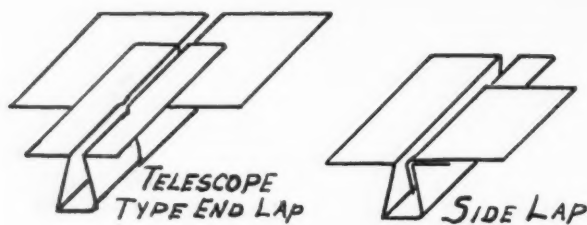
To speed production, a special way was built and three pieces were bolted together and extra ends soldered on before the section was raised to position



section of several units of this siding as it is erected on the job. The siding is 6 inches wide from center to center. When the sections are in place the siding is held to the structural steel by means of special clips and the units are held together by bolts run through the turned flange of the edges.



The roof consists of Holorib metal laid across purlins and fastened by clips. On top of the metal a mop coat, then a 1-inch layer of cork insulation and then a standard built up roof was laid. The roof is light, strong and rigid



NARROW-SPAN HOLORIB

Details of the formation of the Holorib units. The metal is specially formed. The triangular, self-contained ribs provide strength, and movement for contraction and expansion. Sections are telescoped together at ends and lapped along the sides



Much of the erection work had to be worked out by trial and error. Before the job began there was little basis for saying just how many sections might be raised at once and this was worked out on the job. As the building progressed a special way, as shown on one of the photographs, was developed. This way was wide enough for three units bolted together. In addition to speeding erection this way also provided an excellent working table for soldering on such short sections or tapered ends as were necessary to finish out the gables of the building. The photograph shows the workmen soldering on just such a gable section.

The visual effect of this siding on a finished wall is a series of long vertical lines and an appearance which is pleasing because of its unbroken surface. As completed, all this siding will be painted in aluminum.

It might be noted here that the buildings are going to depend on a combination of colors, many of them bright, for striking effects under floodlights and daylight. For instance, on one of the entrances the siding will be aluminum, the doors are bright blue, the trim is to be red and colored lights will be behind sanded glass. The effects sought are going to be something not found elsewhere in this country.

On this one building there is some 160,000 square feet of this metal siding. The siding was de-

Workmen assembling sections of the metal roofing. In the foreground can be seen the end of the cork insulating layer and the appearance of the metal roofing. The insulation is two, ½-inch cork slabs nailed together

View of the tower showing present progress of construction. The tops of the buttress columns will not be covered. These tips are called "sky hooks" around the job. The light colored sections in the foreground are fiber board. The siding and the window grilles are metal

veloped and fabricated by the Detroit Steel Products Company.

The roof and floors of this building are also of metal. This metal is a standard product known as Holorib and is also manufactured by the Detroit Steel Products Company. The material used for the floors and the roof is all standard sections. The roof metal is supplied as shown in one of the detail drawings. The purlins which support the metal are on 3 foot 4 inch centers and the metal used is 24 gauge. The floors are of 22 gauge laid on joists which are 5 feet 4 inches center to center. These joists, by the way, are standard angle and bar truss beams as used in many buildings.

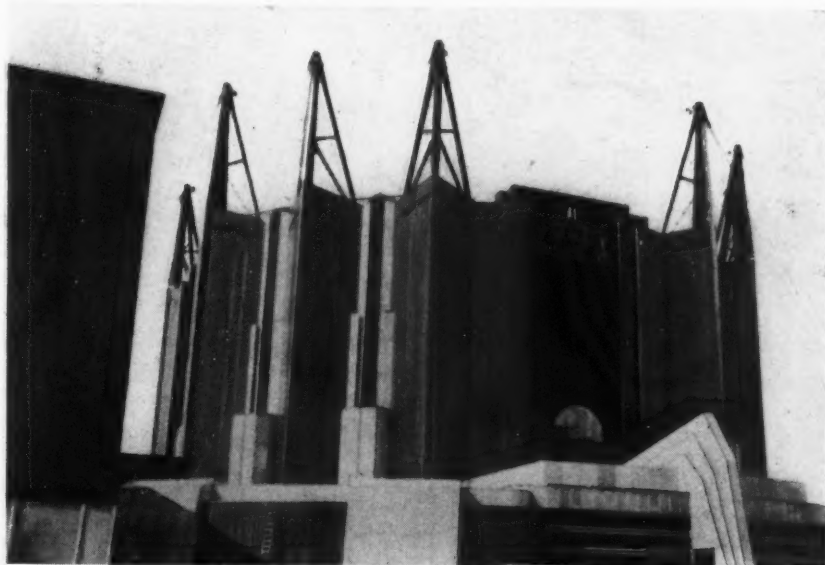
As constructed, the roof consists of the Holorib metal covered with an insulation layer of cork and a standard built up roof.

The Holorib was laid on the purlins and given a mopping of hot asphalt. In this mopping was laid a two-ply section of insulation consisting of two ½-inch cork layers nailed together. The surface of the cork was mopped and a standard built up roof laid.

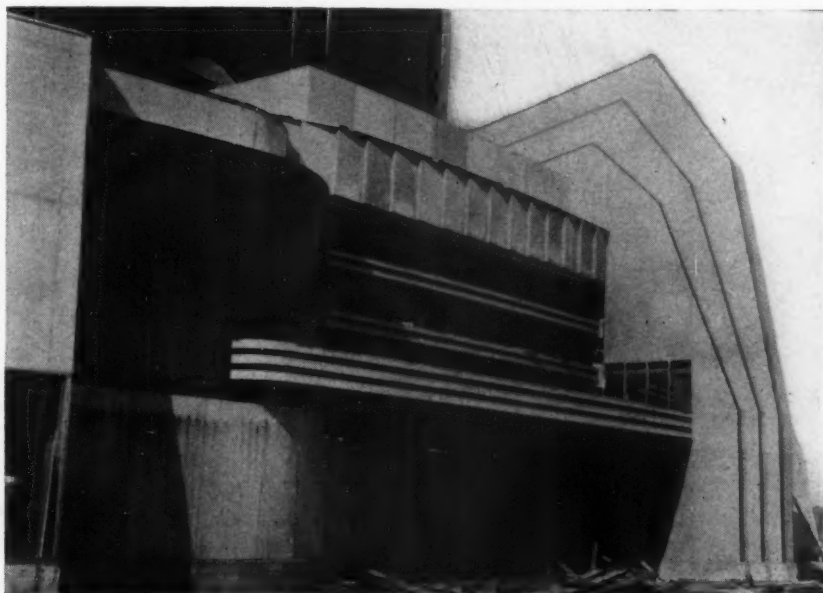
The roof is claimed to possess high resistance to moisture deterioration, a high insulation value and possess long life. Another feature is the lightness of the roof.

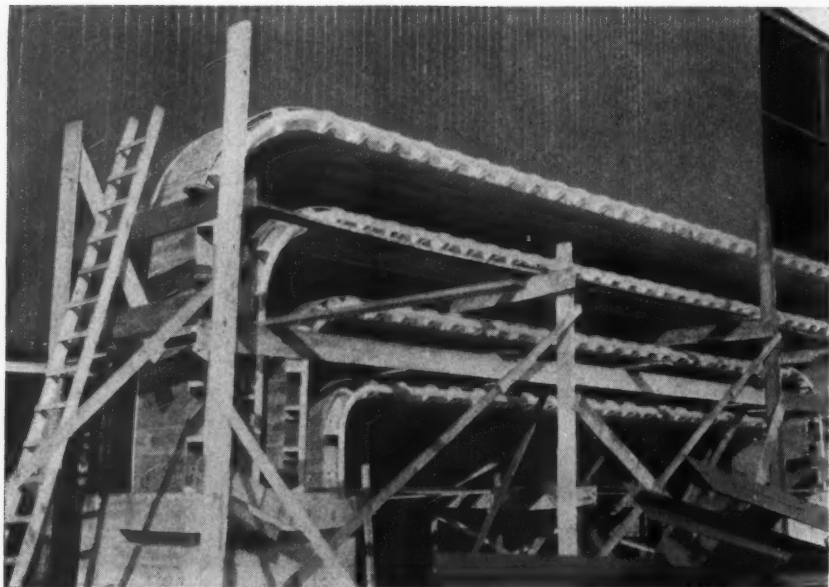
Some of the photographs show operations in assembling the Holorib and laying the roof between the trusses. As can be seen, these trusses are on the outside of the roof, the lower chord supporting

The south entranceway to the tower. The edge of the canopy is metal with the under side fiber board. The buttresses are structural steel encased in fiber board. The lower wall below the siding is also fiber board



This is the main entrance doorway to the exhibition hall. The edges of the canopy are metal. The under side of the canopy is fiber board. The long blanks in the trusses and the vertical columns will contain lights covered with glass





the roof members. This provides a comparatively smooth inside surface for the roof of the building.

In this one building there is more than 340,000 square feet of roofing and flooring metal.

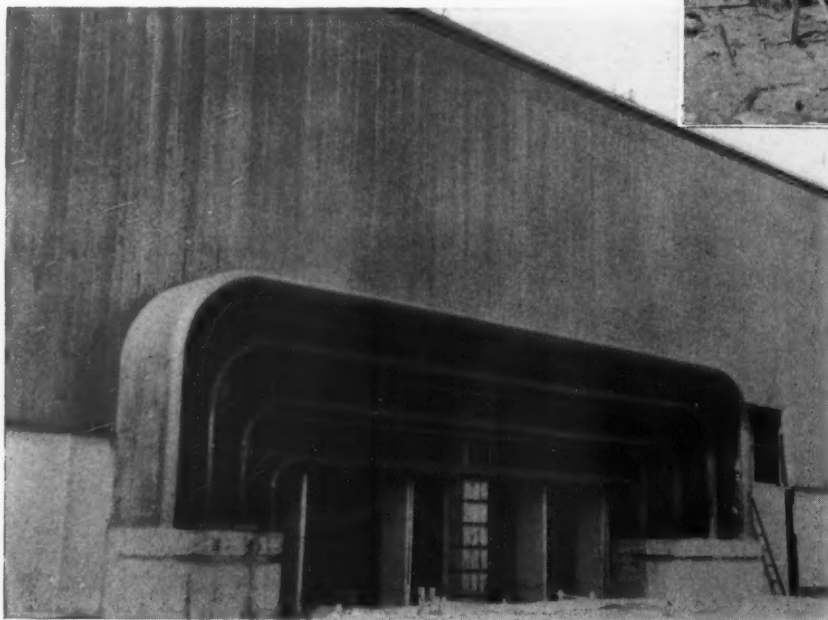
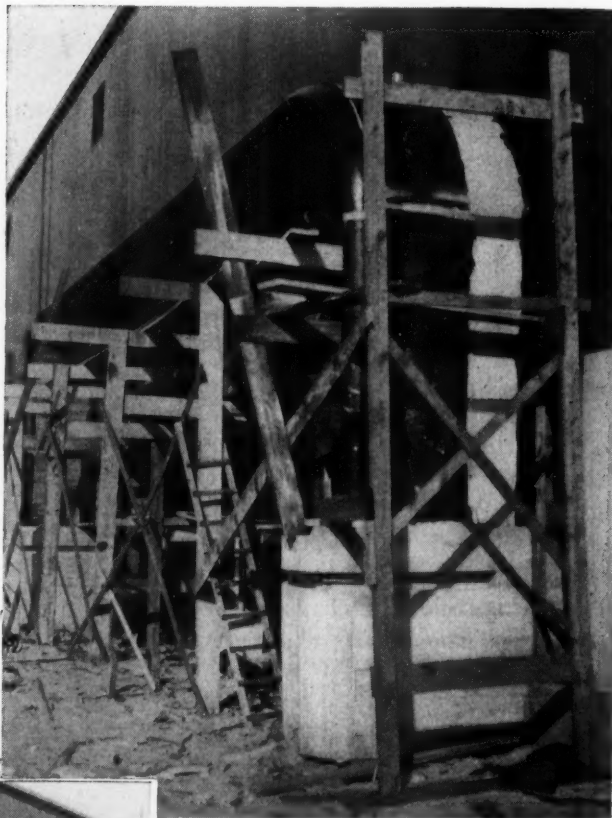
The roofs and the floors were laid by the construction department of the Detroit Steel Products Company.

In addition to this immense amount of metal used on the exterior, there is a wealth of other metal work in the entrance doors, in the gutters and flashings which protect all the setbacks and decks of the building and also a lot of metal throughout the exterior of the big tower. The contract for this

Above — Wood framing of one of the entrance doorways. Much carpenter work entailed

▼
Here the edges of the doorway frames have been covered with galvanized iron and given the first coat of black paint. Joints are soldered

▼
Below—The completed doorway. All seams are flat locked and soldered. Between the frames there will be panels of glass with colored lights behind the glass



metal work and for all the 58 kala-mein doors is held by the Shean Metal Window Company of Chicago.

In all, more than 136,000 pounds of galvanized iron will be used for this contract.

Probably the most interesting detail of this company's contract is the metal work done around the entrance doors and the grille work of the dome windows. All the doors are styled in a type of architecture new to this country. The entranceways consist of a series of inverse setback canopies as shown in one of the photographs. These canopies consist of built up wood backing

covered with galvanized iron which is locked and soldered at the seams and painted in black or whatever color is used at the particular doorway.

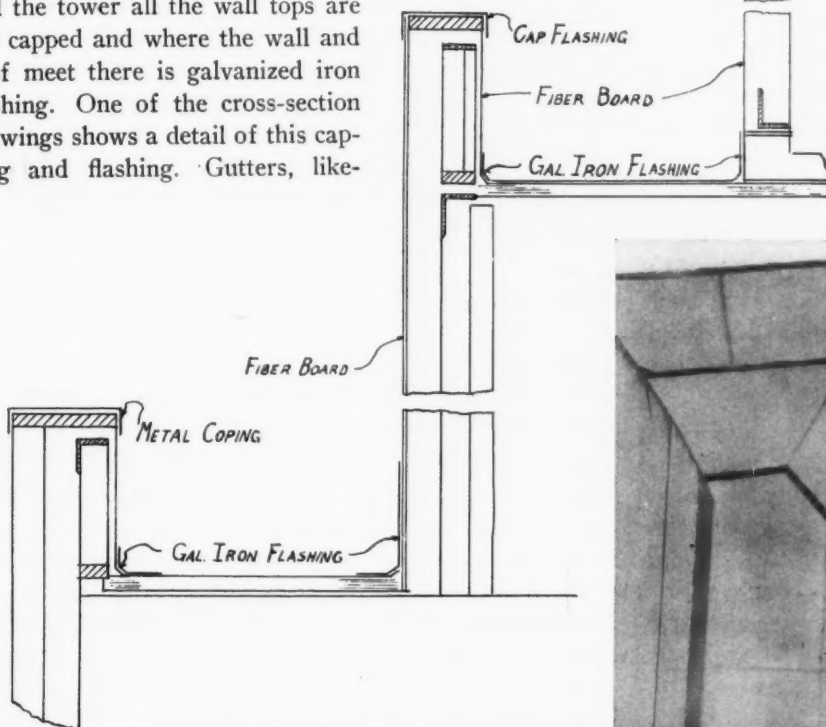
Metal had to be cut on the job because it proved impossible for all the contractors preceding the sheet metal contractor to follow exactly to the scale of the architect's drawings.

Next to the doors the huge windows of the tower are of most in-

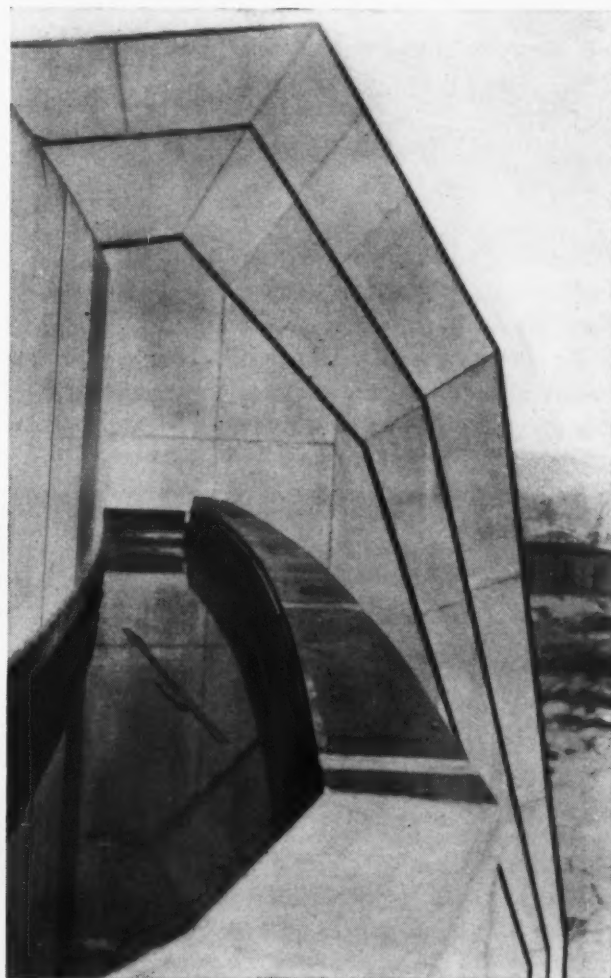
terest. The fretwork of the top of the windows is all sheathed in galvanized iron and here again it proved impossible to form and cut the metal in the shop and most of the work had to be done on the job.

Throughout the main building and the tower all the wall tops are flat capped and where the wall and roof meet there is galvanized iron flashing. One of the cross-section drawings shows a detail of this capping and flashing. Gutters, like-

Cross-section plan showing use of galvanized iron for flashing at flat decks, and for coping caps. The vertical walls are fiber board. All metal is supported on structural framing and wood blocking



Looking down one of the wall caps. The purpose of the metal is to protect the walls which are perishable under exposure. In some instances asphalt impregnated canvas is used for flashing. The buttress is covered with fiber board



A combination gutter and wall capping made of galvanized iron. This is a section of the tower setback. The roof is Holorib covered with a built-up roof

wise, are of galvanized iron and on the building there is both flat box and round hanging gutter.

By way of comparison, the senior Shean had contract work on the last world's fair in Chicago. Most readers know of the temporary construction used on those buildings. In that day sheet metal mechanics got 32 cents an hour and galvanized iron sold for 3 cents a pound. On the Travel and Transport building

galvanized iron is costing about 6 cents a pound and mechanics get \$1.70 an hour. In spite of this vast difference in cost of materials and labor, the present building will probably be erected at less cost than the other fair buildings.

As can be realized, much of the work on this building has had to be experimental. There is no past construction to fall back on for estimating or judging of costs.

How to Get a Satin Finish On Aluminum Castings

IN developing the desired decorative effect for ornamental aluminum work, a satin finish is often employed. This finish gives texture and luster to the surface and has slightly less reflectivity for light than highly polished and colored surfaces, yet it does not possess the coarse texture produced by sand-blasting. It is to aluminum what Roman gold is to gold.

A satin finish may be produced in a number of different ways, depending upon the surface contour of the piece as well as the fineness of the finish desired. The most economical finish and the one most adaptable to all types of aluminum

By DOUGLAS B. HOBBS
(*Aluminum Company of America*)

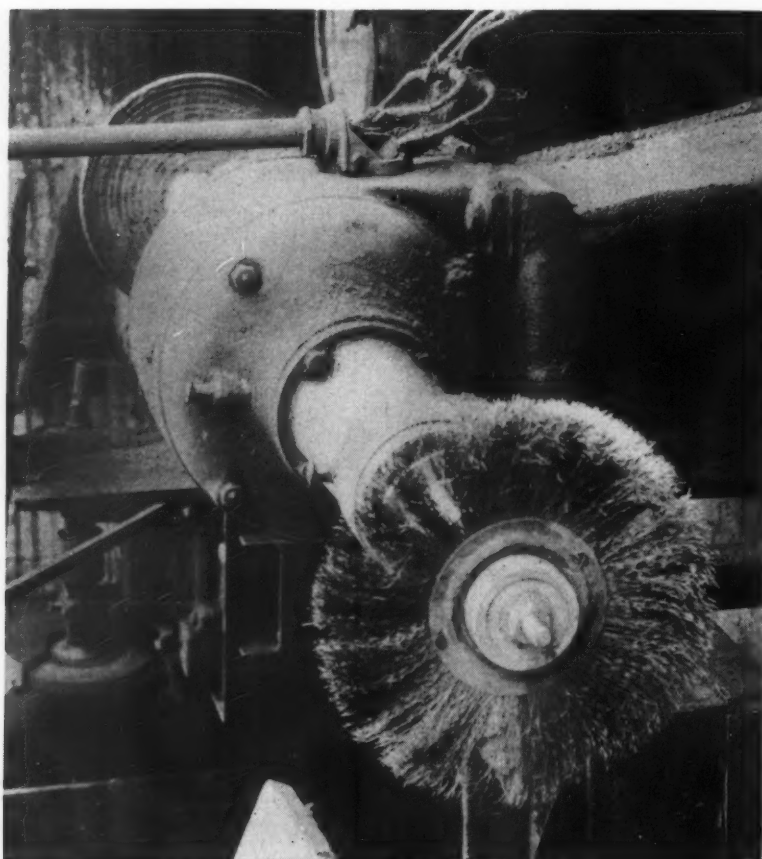
commodities is produced by means of a rotary wire brush on a suitably finished base.

In order to produce a satin finish on aluminum castings, the surfaces should first be roughly polished. It is not necessary to obtain a high degree of polish, as the primary purpose of this polishing operation is to remove the irregularities in the surface of the casting. Polishing is generally done in several steps, depending on the condition of the original surface. Cloth wheels with No. 80, 120 and 180 emery grit are

usually employed. The wheels are made by gluing together old muslin buffs. Glue is painted over the grinding surfaces and powdered emery embedded in the glue. The diameter and thickness of the wheels depend largely upon the work. In most cases an 8-inch diameter wheel, 1½ to 2 inches thick, will give satisfactory results. This wheel should be operated at a speed of 3,400 to 4,400 revolutions per minute.

After the casting has been rough polished with the No. 180 emery grit it should be given a mild blast with silica dust. The dust blast imparts a light-diffusing surface to the casting and evens up any irregularities that might be present on the rough polished surface, thus reducing the time required to obtain the satin finish. If ordinary sand-blast sand is employed, a coarse texture will result. However, the refuse from sand-blast sand, the dust which invariably collects around a sand blast, will give the desired effect.

A rotating wire brush is employed to produce the satin finish. Before using the wire brush on the dust-blasted surface, the surface must be thoroughly cleaned of grease and dirt with a suitable solvent. For convenience the wire brush is usually mounted on a portable grinder. The pressure of the wire wheel on the casting is controlled by the operator. The wheel should be slowly moved the length of the casting in the plane of rotation. Irregular movement of the wheel in other directions will not give an even-appearing surface. Care must be exerted that the pressure of the wire wheel on the casting is not too great. If it is, deep scratches will occur in the casting,



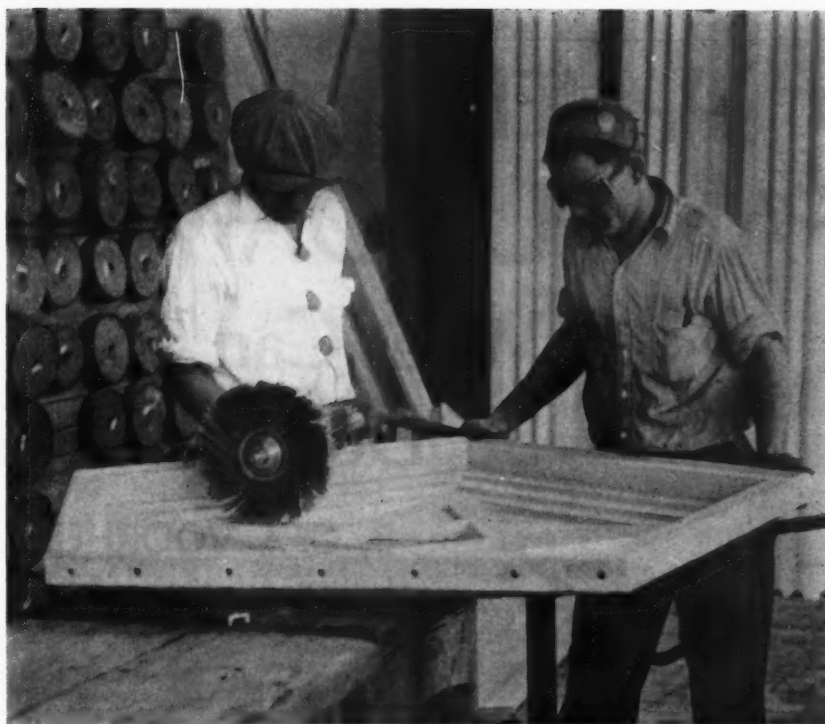
Two spindle stationary grinding wheels. Wire brush shown on near spindle and emery-covered cotton wheel on far spindle. This set-up is only practical for small work that can be easily handled

and these of course are objectionable.

The rotating wire brush is generally made of nickel or German silver wires, 0.006 inch in diameter. A 6-, 8- or 10-inch wheel may be employed. The speed at which the brush rotates is of importance, and as a rule the best results can be obtained at 450-600 revolutions per minute. The wires of the wheel should be cleaned frequently with pumice stone or a soft brick to insure continued uniformity. The wheel should likewise be reversed on the driving shaft from time to time to keep the wires sharp.

It is advisable to clean the surface with carbon tetrachloride or other grease solvents after the satin finish has been produced, in order to remove any dirt or grease which may have collected upon it during the various operations. The original luster can be maintained indefinitely by giving the freshly cleaned surface a coat of clear lacquer.

Another method of obtaining a satin finish is by means of a belt sander. The use of the belt sander is limited to plain flat surfaces, but for these it is more satisfactory than the wire brush. The belt, made



A wire brush mounted on portable hand grinder is often used to produce a satin sheen on aluminum ornamental work

of various grades of emery cloth, is pressed against the casting lightly and evenly until the satin sheen of the proper intensity is obtained.

When using a belt sander it is not necessary to dust-blast the casting. Several steps are used in finishing,

depending upon the original cast surface. Usually belts of No. 80, 120 and 180 emery are sufficient for suitable satin finish. The belt speed should be from 2,400 to 3,000 feet per minute. Finer finishes can be obtained by further polishing with pumice or steel wool and kerosene. This latter polishing is usually done by hand.

A very fine satin finish may be obtained on a high polished surface by a dry satin process using clean muslin buffing wheels and a greaseless polishing compound. The fineness of the satin finish will depend upon the base polish and the grade of grit used in the greaseless compound. The muslin buffs should be well raked before applying the compound. The wheel speed in this case should be from 3,400 to 4,400 revolutions per minute.

These same processes may be employed for producing a satin finish on sheet and rolled and extruded shapes. Since these wrought products have a much smoother surface than a casting, the polishing operation may be omitted to save time and labor in the shop.



Polishing with a portable emery-coated muslin buffing wheel. Buffing wheels with various size emery coatings are shown in the background

APPLIED FAN FUNDAMENTALS [Part III]

What Can and Can't Be Done With Fans

HAVING determined the quantity of heat required by each room, the next step in designing a furnace fan system is to determine the register air temperature.

This may be done in two ways: In heating a school, church, theater or other building where there is a specified ventilation requirement, the quantity of air to be supplied to the room each hour for ventilation may be taken as the basis and the resulting register air temperature determined by computation. The more common method is for the designer of the plant to arbitrarily fix the register temperature and let it control the quantity of air delivered.

In the case of gravity circulation, the Standard Code assumes a register temperature of 175 degrees Fahr. but the plant may be easily designed for any other specified temperature. In gravity circulation, the higher the register temperature for which the plant is designed, the smaller the leader pipes will be. In fan heating, this may or may not hold true. The basic relationship is between the *weight* and temperature of air delivered at the register.

It goes back to the fact mentioned in a previous article of this series that to maintain heat balance within the room, the quantity of heat delivered to the room in a given time must exactly equal the quantity of heat lost from the room in the same time interval. And the

By G. A. VOORHEES
Heating and Ventilating Engineer,
Indianapolis, Ind.

quantity of heat delivered at any given register temperature depends, not necessarily on the size of the warm air duct, but on the *weight* of air delivered to that room through the duct.

One pound of air takes up 0.24 B.t.u. for each degree Fahr. that its temperature is raised and it releases a like amount for each degree of temperature drop. This heat released in cooling is the heat available for offsetting the room heat loss. In explanations and discussions of the research work at the University of Illinois, the expression, "heat available above seventy degrees" has sometimes been confusing. That expression merely means that each pound of air entering the room at a certain register air temperature carries an "excess" of heat which is given up as it gradually cools to the room temperature of 70 degrees. Suppose, for illustration, that one pound of air enters the room through the warm air register at 160 degrees

Fahr. and cools to the room temperature of 70 degrees. Its temperature drop, $160 - 70 = 90$ deg., makes available for offsetting heat loss, a quantity of heat amounting to $90 \text{ deg.} \times 0.24 \text{ B.t.u. per deg.} = 21.6 \text{ B.t.u.}$ If the heat loss of the room is 10,800 B.t.u. per hour, then the weight of air to be introduced through the heat register is: [Formula 1]

This is based on the fundamental formula expressing the relation between (1) the quantity of heat required to raise a given weight of air through a given temperature range, or (2) the quantity of heat released by a weight of air in cooling through a given temperature range as follows:

(Quantity of heat in B.t.u.) =
(Weight of air in pounds) \times 0.24
B.t.u. per pound \times (Temperature
change deg. F.).....(1)

In designing furnace fan systems, after the hourly heat requirement of any room is known the quantity of warm air which the plant must deliver to the room is found by applying the following variation of the basic formula: [Formula 2]

$$\text{[Formula 1]} \quad (\text{Weight of air}) = \frac{10,800 \text{ B.t.u. per hour}}{21.6 \text{ B.t.u. per pound}} = 50 \text{ pounds per hour}$$

$$\text{[Formula 2]} \quad (\text{Pounds of warm air required per hr.}) = \frac{(\text{Hourly B.t.u. heat requirement of room})}{0.24 \times (\text{Difference between register temp. and room temp.})} \quad (2)$$

If on the other hand, the quantity of air to be supplied to the room is fixed by the ventilation requirement or other consideration, then this variation of the original formula applies: [Formula 3]

[Formula 3]

$$(\text{Register temp.}) = (\text{Room temp.}) + \frac{\text{Hourly B.t.u. heat requirement of room}}{0.24 \times \text{pounds of air introduced per hour}} \dots (3)$$

The above formulas express the quantity of air in pounds instead of cubic feet to emphasize the fact that basically, it is the weight of a quantity of air and not its volume that determines its heat content. The specific heat of air (quantity of heat required to raise the temperature of one pound one degree) is practically the same at all temperatures encountered in heating and ventilating work but the quantity of heat required to raise the temperature of one cubic foot of air varies greatly with the initial air temperature because of the great difference in air density at various temperatures.

It has become customary in practical engineering work to deal with volumes of air handled as if the temperature were 70 degrees Fahrenheit. Thus in saying that the velocity of flow in a given warm air duct is 800 feet per minute (F.p.m.) what is meant is that its velocity would be 800 F.p.m. if its temperature were 70 degrees. At a higher temperature the volume of a given weight of air is naturally greater and the actual velocity is correspondingly increased.

Since a "standard" air temperature of 70 degrees is assumed in practical calculations of volumes, velocities and corresponding duct sizes, the above formulas may be expressed in terms of cubic feet of air at a temperature of 70 deg. Fahr. regardless of the actual temperature of the air under consideration at a given time.

The weight of one cubic foot of air at normal atmospheric

pressure and at a temperature of 70 degrees Fahrenheit is 0.075 pound and the volume of one pound of air under like conditions, is $1/0.075 = 13.3$ cubic feet. Since 0.24 B.t.u. will raise the

temperature of one pound of air one degree Fahrenheit, it is also true that 0.24 B.t.u. will raise the temperature of 13.3 cubic feet of air from 70 degrees to 71 degrees. Then the volume of air at an initial temperature of 70 degrees that will be warmed one degree by one B.t.u. is $(1 \text{ B.t.u.} \div 0.24 \text{ B.t.u.}) \times 13.3 \text{ cubic feet} = 55 \text{ cubic feet}$. This is the source of the factor 55 so frequently met in formulas dealing with fan heating problems.

On the practical basis of 70-degree air, formula 2 becomes: [Formula 3A]

[Formula 3A]

$$\text{Cubic feet of warm air required per hour} = \frac{\text{Hourly B.t.u. heat requirement of room}}{0.075 \times 0.24 \times (\text{Reg. temp.} - \text{Room temp.})}$$

It is customary, however, to deal with cubic feet of air per minute which, being one-sixtieth of the hourly volume, brings the equation to the following usable form: [Formula 4]

[Formula 4]

$$\begin{aligned} \text{C.F.M.} &= \frac{\text{B.t.u. per hour required by room}}{60 \times 0.075 \times 0.24 \times (\text{Reg. temp.} - \text{Room temp.})} \\ &= \frac{\text{B.t.u. per hour}}{1.08 \times (\text{Reg. temp.} - \text{Room temp.})} \dots (4) \end{aligned}$$

Formula 3 in like manner, becomes: [Formula 5]

[Formula 5]

$$\text{Reg. temp.} = \text{Room temp.} + \frac{\text{B.t.u. per hour}}{1.08 \times \text{C.F.M.}} \dots (5)$$

Formula 4 is the one most commonly used in designing fan systems for residences and other buildings where the introduction of outside air for ventilation is

not necessary. The register air temperature assigned by the engineer will depend largely on his judgment of conditions in the building for which the plant is being designed.

Since the assumed register temperature for gravity circulation according to Standard Code practice is 175 degrees Fahrenheit, it is obvious that for forced air heating, it should be somewhat less. Miles recommends a maximum of 150 degrees. The recently issued Furblo catalog quotes the American Society of Heating and Ventilating Engineers as recommending temperatures between 90 and 120 degrees. Many practical engineers design most of their plants for temperatures ranging from 110 to 140 degrees depending on the building, whether it is residence, church, school, theater, store room, garage or industrial building; and depending on the type of plant, whether it is designed for intermittent or continuous fan operation.

The lower the register air temperature, the greater the quantity of air that must be delivered to offset the hourly heat loss of a given room.

Example: If a room has an hourly heat requirement of 16,200

B.t.u. per hour, the volume of warm air measured at 70 degrees that must be delivered at a register temperature of 175 degrees is, by formula 3:

$$\frac{16,200}{1.08 \times (175 - 70)} = 143 \text{ C.F.M.}$$

At 150 degree register temperature, the volume of air required is:

$$\frac{16,200}{1.08 \times (150 - 70)} = 187.5 \text{ C.F.M.}$$

At 130 degrees:

$$\frac{16,200}{1.08 \times (130 - 70)} = 250 \text{ C.F.M.}$$

At 100 degrees:

$$\frac{16,200}{1.08 \times (100 - 70)} = 500 \text{ C.F.M.}$$

If the room in question contains 3,000 cubic feet of space, the number of air changes (or recirculations) per hour will be:

$$\begin{aligned} \text{Changes per hr.} &= \frac{(60 \text{ min.}) \times (\text{C.F.M.})}{3,000 \text{ cu. ft.}} \\ &= \frac{\text{C.F.M.}}{50} \end{aligned}$$

The third column of Table 1 shows the number of times per hour that the room air is changed for various register temperatures.

To change the air in the living room of a residence ten times an hour demands extreme care in the placing of both warm air registers and return air faces in order to avoid complaint of drafts through the room, yet this would be necessary in the room in question if the plant is designed for a register air temperature of 100 degrees Fahrenheit. For this reason, the tendency in designing fan systems for residences, is to base the design on a register air temperature of about 130 degrees F.

The chart (Fig. 1) gives the

This chart shows how you can determine the C.F.M. necessary to supply a required number of B.t.u.'s at diffusion temperatures. The diffusion temperature is the temperature maintained by warmer register temperatures mixing with colder room temperatures. It is lower than register temperature and higher than average room temperature

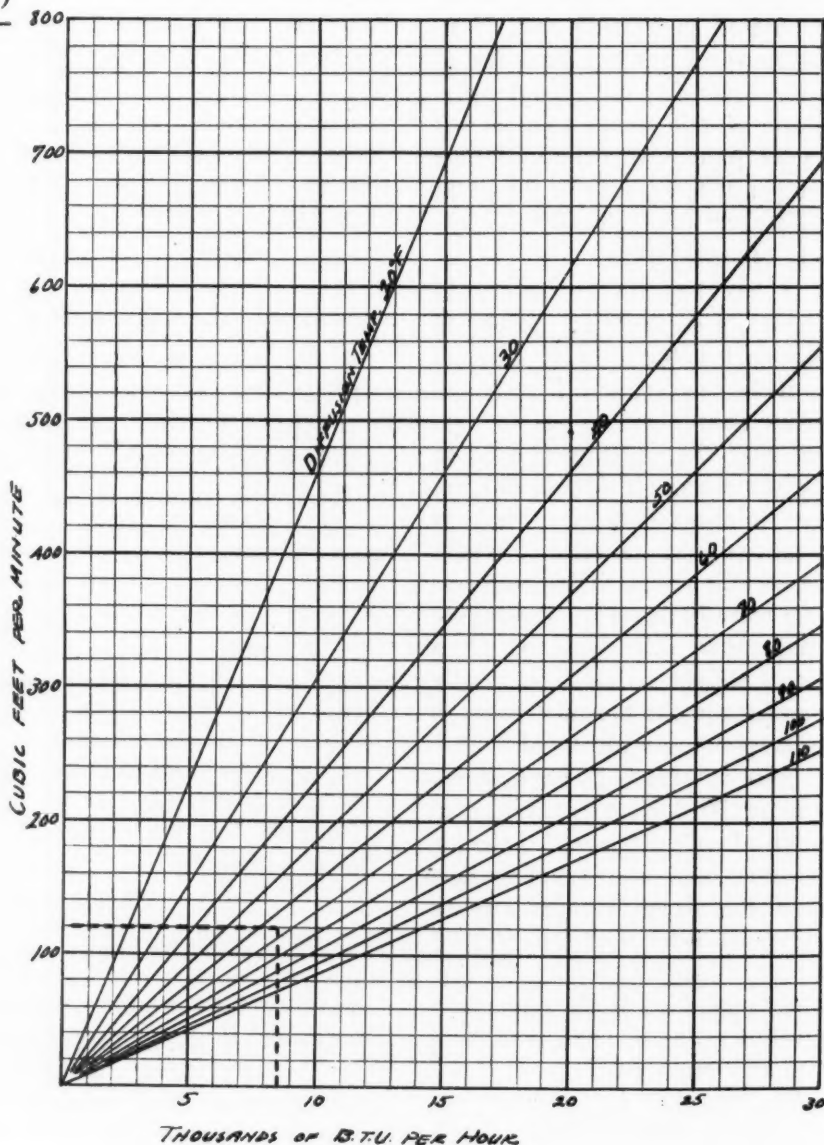
TABLE 1

Cubic feet of air per minute and number of air changes per hour required at various register air temperatures in a room containing 3,000 cubic feet of space and having an hourly heat loss of 16,200 B.t.u.

Register temperature	C.F.M.	Number of air changes per hour
175	143	2.86
150	187.5	3.75
130	250	5.0
100	500	10.0

C.F.M. required to provide the given number of B.t.u. per hour at various diffusion temperatures, the term "diffusion temperature" being defined as the difference between the register temperature and the average room temperature.

ture. Example: Suppose a room has an hourly heat loss of 8,500 B.t.u., and a room temperature of 75 degrees Fahrenheit is called for, how many cubic feet of air per minute must be supplied at a regular temperature of 140 degrees? First find the diffusion temperature which in this case is 140 degrees minus 75 degrees, or 65 degrees. Locate at the bottom of the chart, the position representing 8,500 B.t.u. and project vertically upward to the point of intersection with the imaginary line representing a diffusion temperature which will be approximately half way between the 60-degree and the 70-degree line. From this point, project horizontally to the left to find that 120 C.F.M. will be required.



FAN BLAST ENGINEERING

By PLATTE OVERTON
Heating Engineer

Floor Loss and Air Change

WE now have checked all items 1 to 18, inclusive, and our next item is 19—Floor loss B.t.u. per hour. Referring back to the issue of February 16, we find on the cross section of the building wall that our floor is 4-in. concrete on cinder fill and the constant is .31. The ground temperature is given as 30 deg. Our factor as explained in the issue of February 16 is the temperature rise 30 to 70 equals 40 times .31 equals 12.4.

We measure all the floor space within 10 feet of the outside wall and multiply this space in square feet by the factor in item 4 (12.4). This gives us the answer for item 19.

Item 20 is figured only for rooms with ceiling exposed to attic spaces or roofs. In all buildings with more than one floor, only those rooms on the top floor are considered or such rooms on other floors that have no heated space over them.

Generally, we may multiply item 3 by the factor in items 5 for the item 20. In the case of churches or buildings with arched or uneven ceilings the measurements must be taken from the plans.

Item 21 is item 8 times the factor I. Item 22 is the total of items 17, 18, 19, 20 and 21. For item 23 we deduct 50 per cent of item 21 or divide it by 2 for our answer.

It will be noted that we allow in item 21 a leakage loss for every room. In fact we will have a loss from only about one-half of the

rooms as the wind will not blow from more than one direction at a time, and on the windward side of the building we will have ex-filtration, as explained in the issue of March 2d. This is deducted for the heater size only.

Item 24 becomes item 22 minus item 23.

Our next items are headed "Service." Item 25 is air supply C.F.M. (cubic feet per minute).

The C.F.M. may vary and while theoretically we must supply the required amount of air at a certain temperature, that cooling to breathing line temperature (70 deg.) will give up enough B.t.u. to offset the loss shown in item 22, in practice our inlet temperature will vary. When the C.F.M. is fixed by state law in such buildings as schools, theatres, and

(Continued on page 38)

Rooms No.	1	2
Use		
MEASUREMENTS		
1. Room Dimensions		
2. Cubic Feet Space		
3. Room Floor Area		
4. Floor Const. & Factor		
5. Ceiling Const. & Factor		
6. Window Const. & Factor		
7. Wall Const. & Factor		
8. Exposed Sash and Door Perimeter, equiv.		
9. Leakage B. T. U. per ft. of Perimeter		
10. Expd. Wall Gross Area		
11. Expd. Window Gross Area		
12. Expd. Wall Net Area		
13. Exposure Direction		
14. Room Temperature		
HEAT LOSSES		
15. Wall Loss B. t. u. per Hr.		
16. Window Loss B. t. u. per Hr.		
17. Subtotal Loss B. t. u. per Hr.		
18. Expos. Allow. B. t. u. per Hr.		
19. Floor Loss B. t. u. per Hr.		
20. Ceiling Loss B. t. u. per Hr.		
21. Leakage Loss B. t. u. per Hr.		
22. Total Heat Loss		
23. Deduct for Heater Size		
24. Heater Building-loss Load		
SERVICE		
25. Air Supply C. F. M.		
26. Recirculation C. F. M.		
27. Air Supply Inlet Temp.		
28. Air Supply B. t. u. Service		
29. Direct Radn. B. t. u. Service		
30. Direct Radn. sq. ft.		
31. Grav. Ind. Radn. sq. ft.		
32. Aspir. Coils Radn. sq. ft.		

LET'S MAKE SOME MONEY

by
BENJAMIN F. JOHN



OFFICE VS MECHANICAL IMPORTANCE

WHEN you started business for yourself, didn't you figure that if the "boss" could do it, so could you?

And that was right, but before you accomplished much, you took the office "bumps" that the boss met, and which you knew nothing about as a mechanic.

As I recall the many mechanics that I have known, that is, the men who were real mechanics, I can remember the hard training they received and their concentration to learn to be mechanics, and afterward the years spent to perfect themselves, then their graduation to inside or outside foreman, and some of them to business men.

I can remember the satisfaction and pride that lit their faces, when a really handsome job was finished and the owner and boss told them in glowing terms how much they appreciated their skill.

It was a darn hard task to become a good mechanic then, and it is a darn sight harder for these men to learn to be successful business men now. Today it requires that same hard training and concentration that taught the mechanical end of the business, to make the happy combination of both that means success.

The old office force, maybe just a "kid," was usually looked down upon as a necessary evil, and he was given to understand that orders only came from the "boss," and that the "white collar" job was supported by the mechanic.

That combination of good mechanical ability and business sense was and is rare, and those who

have succeeded in our line, from my knowledge, have done so because after one or two hard knocks, they had "horse sense" enough to listen to outside advice from those who knew, and heed it.

Listening to the history of a number of men in our line, told by

The mechanic in his shop, in the old days, worked and interviewed the customer, and that customer usually called or wrote first. Today the letter, advertising, salesmanship, directed by the office, seeks, sells and directs the work. That is the modern way.



The old-time mechanic was a real artisan. He spent years learning his trade, and the highest compliment for him was praise of some job he had turned out. Apprentices got a thorough mechanical training, but an absolute lack of any training or education in the managerial end of the business

themselves, reveals that a great deal of credit for their success has been given to the wives, bankers, other business men, as well as former employers.

Doesn't it seem that things have reversed themselves and that the mechanic is now supported by the office?

Someone started it, the public liked it, it was easier for them; then everybody followed.

The old shop with a desk back of the door or in the window, and even the old bank, with one or two desks, safe and wooden railing, are gone. Note the difference today. Its progress.

A good mechanic loves to do things with his hands, and the more intricate the problem the better. No one will deny that this is an accomplishment of decided value, yet in many instances this very fact robs a man of ability to see that the things done by books, records and office help are also matters that have to be learned.

In the old days the first few

worry and the mind is now not so clear.

Then is the time when his trade association, manufacturer or jobber, can be of service to direct him to the proper road. If that does not happen, the dealer settles into the "rut" and becomes just another "tinker."

The great trouble seems to be that the majority keep their troubles

wished to ask any questions.

The son asked for many explanations and among them was the question, "Shall I continue paying dues to the trade organization? Is it any good?"

"Well—you may do as you please—you know this is now your business but it was the men I met and listened to in this association, that taught me how to make all the money I have today."

This firm is still a member of the association and the son is an active worker in it. This is written from the unsolicited conversation of this son.

There is no royal road to success in our line any more than in any other. Yet in view of all this, is it not folly for any man to fail to investigate local trade association, where so many men have learned "to make money"?

The average shop does not need an elaborate set of books and records. In fact such books and records are usually not understood and soon are neglected.

Today every successful man must be able to write suitable letters and give estimates; to plan and prepare ahead; to do advertising; to check the costs on jobs through proper cost and work sheets; to send out bills promptly and statements regularly and keep a set of simple books, which can be balanced each month.

To know all the facts about business is to learn more. To compare costs is to prevent loss. To know costs of previous jobs prevents the mistake of accepting jobs without a profit.

In fact business men tell us that the office part directs the smooth progress of a business, proves where profit can be made, and shows just how much expense the business can afford.

An article this month addressed to the oil burner dealers in one of their trade magazines, after urging the oil burner dealer to go after the warm air heating business in conjunction with installing oil burners, and pointing out the



Most old-time sheet metal and heating men graduated from the ranks. They knew their metal working and heating from A to Z. But good operation, bookkeeping, selling, advertising, finance and management were held so lightly that a desk in the corner of the shop served their needs

years of a mechanic's business life usually were successful. There was new money in hand; the customers he found allowed for the fact that he was just starting; his troubles were few and collections easy and made promptly because necessity demanded it.

But after a little while, matters began to multiply, and trifles were magnified; men were employed, some took advantage of the employer, and then he thought he must work with the tools.

Soon he found that certain bills were hard to collect, usually because he had been too generous in the early days, early capital is tied up, and there doesn't seem to be much of profit in jobs. Bills begin to

within themselves. But those who seek outside advice and help overcome all obstacles and go ahead properly. Those who have retired with a good income and those who hate to quit because of love for the business and its associations are invariably boosters of outside help.

Just recently a young man succeeded to his father's business. The father had decided to retire, and could well afford to do so. He and his wife decided to travel in this country and then go abroad for a trip of several years. Before leaving he deeded the shop, fixtures and assets to his son, who had worked for him for several years. After explaining his experiences in business, he asked the son if he

PROFITABLE opportunity, has this to say:

"This situation comes about because of the widespread and ad-

in the art of selling. As a consequence the burner dealer steps into a ready made position where he legitimately can operate to greatly

Then the article goes on and takes a "wallop" at the old hot air heater and its limitations which "is far from present day standards of human comfort."

Continuing, the article says, "On the other hand, the modern warm-air system, providing for tempered—not hot air, mechanically circulated under definite control, and humidified under automatic control, is so far ahead of any other kind of house heating that, with proper educational work, it is destined to sweep the country to its four corners.

"The great opportunity for the oil burner dealer lies in an aggressive campaign to sell oil heating comfort to the owners of the almost millions of old fashioned heating plants, at the same time modernizing them to provide heating comfort of an ideal quality. So while this is to be a technical article on warm air heating systems, it is designed also to open the eyes of the burner dealer to a great opportunity."

And he is right, it is a great opportunity. This was written by an engineer, who wrote a book on heating, and has observed the needs in heating throughout the country. Watch his words come true.



Today's heating and sheet metal contractor must first of all be a business man if he hopes to hold his place in the keen competition of present life. The business can no longer be run from a corner of the work bench, and more dependence must be placed on clerical help. This means improved offices and modern equipment

mitted weakness of the heating contractor as a merchandiser—and the men who install warm air heating plants are but little advanced

improve half of the heating plants to which he applies burners, at the same time materially increasing his profits."

FAN BLAST ENGINEERING

public halls, item 25 must carry these requirements. Let us say we have a school room with forty pupils, and our state law demands 30 C.F.M. per pupil. This gives us 30×40 equals 1200 C.F.M.

The following table gives a conservative estimate on requirements for public buildings:

Air Allowed Per Person— Cubic Feet Per Minute	
Hospitals (ordinary).....	40
Hospitals (epidemic).....	80
Work Shops	25
Prisons	30
Theatres	25
Meeting Halls	20
Schools	30

(Continued from page 35)

In the case of churches and auditoriums with balconies, large volumes of air are necessary to prevent the overheating of the balcony and maintain even temperatures over the large areas of floor space. Air changes of from 10 to $7\frac{1}{2}$ minutes are required. Thus an auditorium with 200,000 cubic feet of space, and a balcony would require from 20,000 to 26,000 C.F.M. regardless of the state law requirements. Such an auditorium may seat only 500 people and require only 15,000

C.F.M. according to the ventilation code.

Thus it will be seen that item 25 will vary with building requirements and general use.

For ordinary problems with rooms where the heat requirement is the only thing under consideration we may divide the B.t.u. loss (item 22) by the factor 48.96. Thus if our B.t.u. loss is 25,000 our C.F.M. is 25,000 divided by 48.96 equals 510 C.F.M.

This factor 48.96 is explained in detail on page 43 in the February

(Continued on page 45)

SIMPLIFIED FACTS FOR GAS EQUIPMENT SALESMEN

By L. W. MILLIS*

INTRODUCTION

THE first thing to get fully in mind is the unit of heat measurement. It is known as the British Thermal Unit, written B. T. U. or B.t.u. or b.t.u. and sometimes heat units. It is the amount of sensible heat required to raise one cubic foot of air fifty-five degrees (or fifty-five cubic feet one degree) or one pound of water one degree. These measurements are at certain standard temperatures.

Throughout this series of studies extended refinement of standards and measurements will be ignored but will be sufficiently accurate for practical work. The use of figures instead of written numbers will be indulged in to promote condensed statements.

Artificial gas contains from 350 to 550 B.T.U. per cubic foot. Natural gas contains from 800 to 1100 B. T. U. per cubic foot. These figures vary according to the quality of the gas and according to temperature and to barometric pressure. In these studies calculations will be for natural gas containing 1000 B. T. U. per cubic foot. Further refinements of measurement will be ignored.

It is manifest that the flow of gas through the orifice will be affected by the pressure of the gas. Also by the form of the opening, such as a round hole in a thin disc, as well as by the size of the opening. I think of gas flow as I do of oil. Less quantity of thick heavy oil will flow through an orifice than if the oil is thin. Gas has great variations in weight (specific gravity).

*President, Study Club, Security Stove and Manufacturing Company, Kansas City, Mo.

This is the first article of a series explaining those scientific facts which every gas heating salesman, installer and engineer ought to be familiar with. The facts presented were established in an extended study conducted by the author.

—The Editor.

It is unfortunate that there is no very exact relation between the specific gravity of gas and its heating value.

There are many tables giving the orifice discharge of gas. So far as

I know there are no two published tables of orifice discharge that are based on the same conditions. The conditions, such as length of orifice channel and the angle at which the gas approaches the channel are not always given. Some tables are rated in "ounces" of pressure while others are stated in "inches of water pressure." Lack of uniformity of such statements leads to much confusion.

The following "Orifice Discharge" table No. 1 is calculated from the table of air discharge shown in Bulletin No. 1 of the American Gas Association, page 16, and from coefficient for 60 per cent specific gravity, page 17, angle of approach 15 degrees and discharge through a short channel.

TABLE 1
Passage of Natural Gas Through Burner Orifices
(in Cubic Feet per Hour)

Morse Drill No.	.52	.40	.39	.31	.29	12	7/32	E1/4
Square in. Area	.0032	.0075	.0078	.0113	.0145	.0280	.0376	.0491
Nearest fraction of in.	1/16	3/32	3/32	1/8	9/64	3/16	7/32	1/4
Pressure at Orifice In. Water Ounces								
2	1.15	8	19.1	19.7	29	37.2	72	96.6
3	1.73	9.8	23.5	24.2	35.5	45.5	88	118.0
4	2.31	11.3	27.1	28.2	41	52.4	101	135.4
5	2.89	12.5	30.3	31.2	46	59.0	114	153.0
6	3.46	13.5	33.3	34.6	50	64.6	125	167.6
7	4.05	15.0	36.0	37.1	54	71.2	137	183.8
8	4.62	15.7	38.7	41.0	58	73.8	143	191.7
9	5.20	16.8	41.0	42.1	61.6	79.5	154	206.2
10	5.76	17.5	43.0	44.5	65	83.2	161	216.0

Multipliers to Convert Flow at .60
Gravity to Other Gravities

Gravity	Multiplier	Gravity	Multiplier..
.30	1.41	.70	.93
.35	1.31	.75	.89
.40	1.22	.80	.87
.45	1.15	.85	.84
.50	1.09	.90	.82
.55	1.04	.95	.79
.60	1.00	1.00	.75
.65	.96

Pattern for a Twisted Pipe

For E. W. Robinson, Bridgeton, N. J.

By L. F. HYATT

Contributing Editor

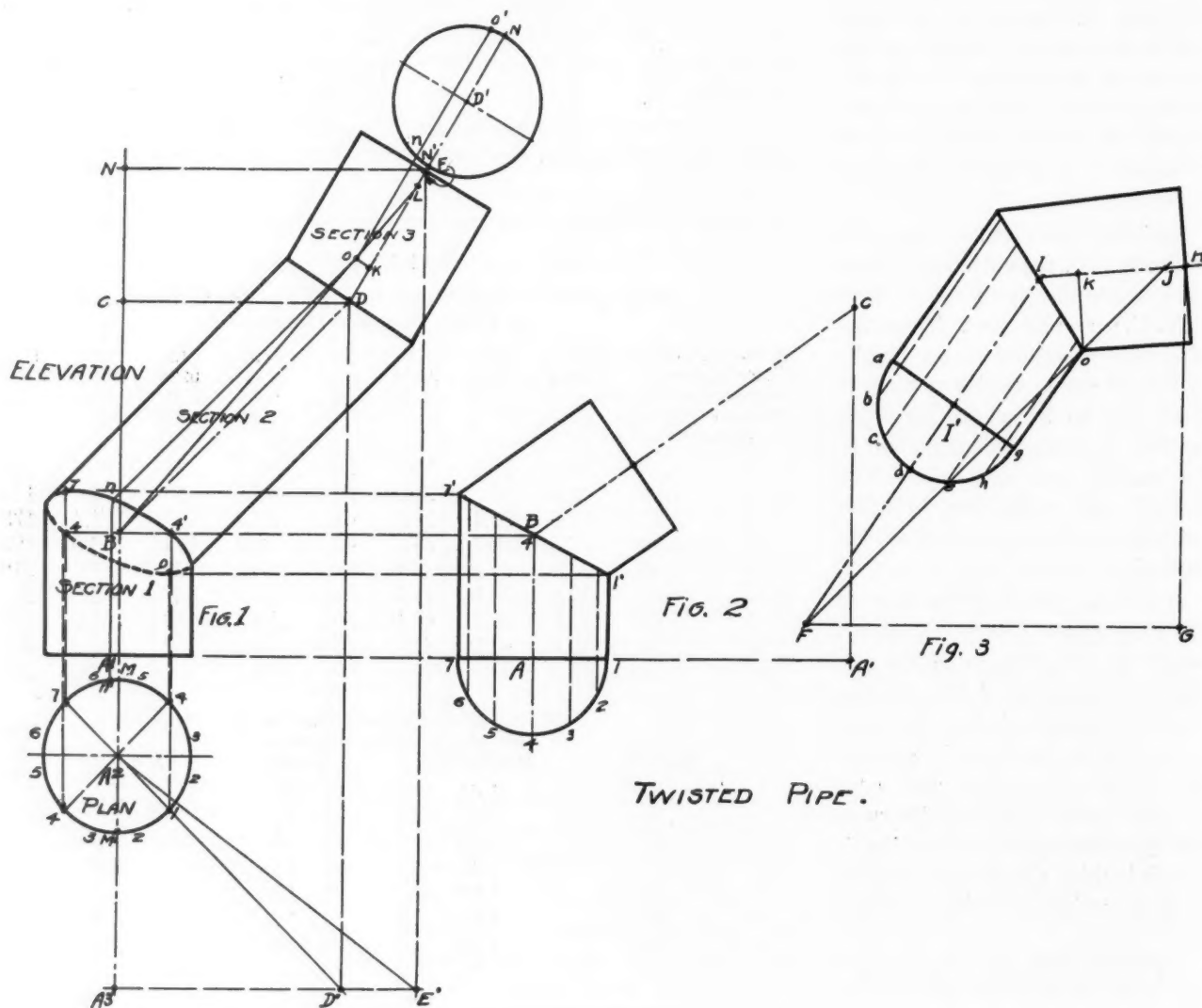
THE accompanying development problem was one of a group of twisted pipe problems requested by an "ARTISAN" reader in Bridgeton, New Jersey. This type problem is always more or less confusing, due to the twist at the intersection of the different parts.

Begin the elevation view by erecting the line A1 to N. Through A1, which may be located anywhere on the line, draw a horizontal line of

indefinite length. Now step off the distance A1 to B the desired length of Section 1. Next step off the distance B to C the desired vertical distance between the elbows. Through C draw the horizontal line C-D equal in length to the offset of the elbow. Also step off the distance C to N on the vertical line. Draw the horizontal line N-N' and the center lines B-D-N'. This completes the center lines of the elevation view.

Now draw the outline of the elevation view as shown in Figure 1. At a suitable distance below the elevation locate A² and draw the circle representing the opening of the pipe.

Now with the dividers set the horizontal distance between elbow B and D, in this case C-D found on the elevation, step off a like distance A² to A³. Through A³ draw the horizontal line A³-D and drop lines from D and E on the elevation



view, thus locating points D' and E' on the plan. Now draw the diagonal line from D' through the center point A², to the circumference, and number the point 7.

To obtain the miter line of elbow B extend the base line to the right, as shown by A1 to A', Figure 2. Locate A, Figure 2, as desired, and erect a perpendicular line at A equal in length to A1-B on the elevation. Now take the distance A²-D' on the plan, which is the diagonal distance between the elbows, and step it off from A to A' on Figure 2. At A' erect a perpendicular line and upon this line step off the distance from A1 to C found on the elevation. This is the height of Sections 1 and 2. Connect points B and C, Figure 2. The line B to C is the true length of Section 2.

Parallel with the line A-B draw the outline and profile of Figure 2. Now draw the miter line of Figure 2. Divide the half profile in Figure 2 into six equal parts and number them as shown. From each of these points draw perpendicular lines intersecting the miter line.

Since Section 3 and Section 1 are not parallel there is necessarily some twist in Section 2. The lines used on one end to obtain the miter line for B must be set around from those on C. A²D¹ on the plan represents the direction of the axis of Section 2, and the intersection of this line with the circle locates the throat 1 and the back 7. Now draw a line through A2 and at right angles to D'-7, thus locating the sides 4-4. Next divide each of these quarters into three equal spaces, as was done in Figure 2 and draw vertical lines of indefinite length. To avoid confusion these lines are not all drawn. Next draw horizontal lines from points 1, 4, and 7, intersecting the vertical lines of like number from the plan, and through these points draw the ellipse representing the miter line of the elbow. Before obtaining the amount of twist needed in Section 2 it is necessary to locate either the throat or back of elbow C in its correct loca-

tion in the elevation, but before we can find such a point we must first obtain the correct angle of elbow C. In Figure 3 draw the horizontal line F-G equal to the distance A² to E' found on the plan. This is the diagonal distance between elbow B and the end of Section 3. At G erect the perpendicular distance G-H equal to the distance B-N found on the elevation view. This is the vertical distance between the elbow and the end of Section 3. Now with the distance E-D found on the elevation, which is the true length of Section 3, and H in Figure 3 as a center, strike an arc of indefinite length. With the distance B-C Figure 2, which is the true length of Section 2, and F on Figure 3 as a center strike an arc intersecting the arc just drawn locating I on Figure 3. This point is the center of miter C. Now draw the center line F-I-H. Draw the base line through H at right angles to I-H. Make I-I' equal to I-H and complete the outline as with Figure 2. Draw the half profile. Divide it into six equal parts and letter as shown, and draw lines parallel with F-I, intersecting the miter line. To obtain the twist in Figure 2 first draw with a straight edge a line from F through O, allowing it to intersect the line I-H at point J. Now with the triangle placed on the line H-I, and on point O draw the line K-O in Figure 3. We have correctly located the line F-J and throat O. From this line we can locate the throat O in its correct location on the elevation. To locate this line on the elevation we must now locate points J and K. The center line E-D in the elevation is shown in its true length and point B is also in its proper position. From Figure 3 take the distances I-K-J and transfer them to Section 3, Figure 1. D to K equals the distance I to K on Figure 3 and K to L equals K to J, Figure 3. Point B is in its correct location on the elevation view. Now draw a straight line from B to L. This of course corresponds to F-J in Figure 3. With the triangle on the line D-L

and point K, section 3, Figure 1, draw the short line K-o at right angles to D-L. This locates point o, which is the throat in its correct position. At any point on the center line draw the circle D', representing the end of the pipe. From point o, Section 3, Figure 1 draw the line o-o' parallel to the center line. Parallel with the center line B-D draw the line from point o to point n on the ellipse, and from n drop a line parallel with A1-B to n' on the plan. Since 7 is the back of the elbow and n' is the throat, the distance from 7 to n' measured around the circle on the plan is the amount of twist required in developing the pattern for Section 2.

To begin the development of the patterns, which are done by the parallel line method, start with Section 1, pattern 1, as is done with any elbow pattern. The lengths are taken from Figure 2 for the miter. First draw the line a-b, Figure 4, equal in length to twice the number of spaces found on the half profile A, Figure 2. Since the seam comes on point 4, start with 4 and number the spaces as shown. Point 7 is the back of the miter B and 1 the throat of Section 1. From point 1 on the pattern step off the distance 1 to M' found on the plan, and from 7 on the pattern step off the distances M to 7 found on the plan, thus locating M and M' on the pattern. These points are used in case a flange is wanted on this end. Draw vertical lines from each numbered point and step off the vertical distances found on Figure 2 on the pattern, and draw the curved line, thus completing pattern 2.

Next the pattern for Section 3 can be developed. Draw the line c-d equal in length to the circumference of the pipe. This length is the same as Section 1. The lengths are taken from Figure 3 and stepped off as with part 1 of the elbow, and the vertical distances stepped off and the curved lines drawn. Since the throat is three spaces from the left side in pattern 1, the throat will be three spaces

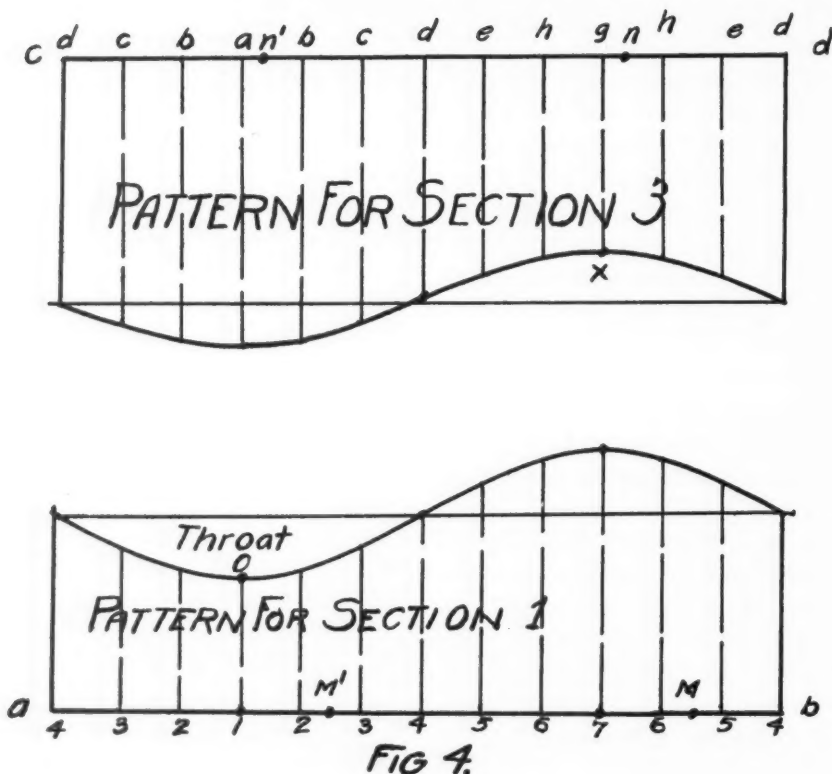


FIG. 4.

from the right side in pattern 3 and is indicated by x. Points N and N' on the elevation would be the vertical centers in case a flange is wanted on the end. Now take the distance o' to N on the elevation and step off the distance g-n on pattern 3, also the distance N' to N on the elevation and step it off on the pattern from a, thus locating N'.

Begin the pattern for Section 2 by first drawing the line O-O equal in length to the circumference of the pipe. Erect the lines O-P on each end equal in length to B-C, Figure 2. Take the distance A to B, Figure 2, and step it off on the lines O-P, thus locating points 4, and draw a horizontal line connecting these points. Divide this line into 12 equal spaces and through these points draw vertical lines of indefinite length. Now refer to pattern 1. Since the throat is in 3 spaces from the right on pattern 1 it will be in 3 spaces from the right on pattern 2, indicated by the line o-1. Complete the numbering as shown on line 4-4. On the vertical lines lay off from

line 4-4 the similarly numbered distances found on Figure 2, and draw the curved line through these points. From points P on the vertical line A-B, step off the distance I-I' which is the same length as I-H, and draw the horizontal line S-S. Now from the plan, Figure 1,

take the distance from 7 to n', which is the distance from the back of elbow B to the throat of elbow C, and step this distance off on the line 4-4 as represented by 7-n. This is also equal to the distance between the sides of the elbow as 4-n and 1-n. In each case n is located to the right of the point.

Draw lines from points n to line P-P, parallel with lines O-P. As 7-n locates the throat, which is marked g-o in Figure 3, where this line crosses line S-S mark it g. Between the lines which are drawn from points n step off on the line S-S three equal spaces. Draw in all lines parallel to O-P. From Figure 3 take the distances as was done before and step them off on the vertical lines just drawn and draw the curved line through these points, thus completing the patterns. The spaces c and b outside the pattern are of course used only to determine the correct curve and are not a part of the pattern. When assembling the piece in the miter B of parts 1 and 2, points o and o go together and in the miter of elbow C parts 2 and 3, points x and x go together. Any failure to match these points will result in inaccuracy in the twist of the elbow.

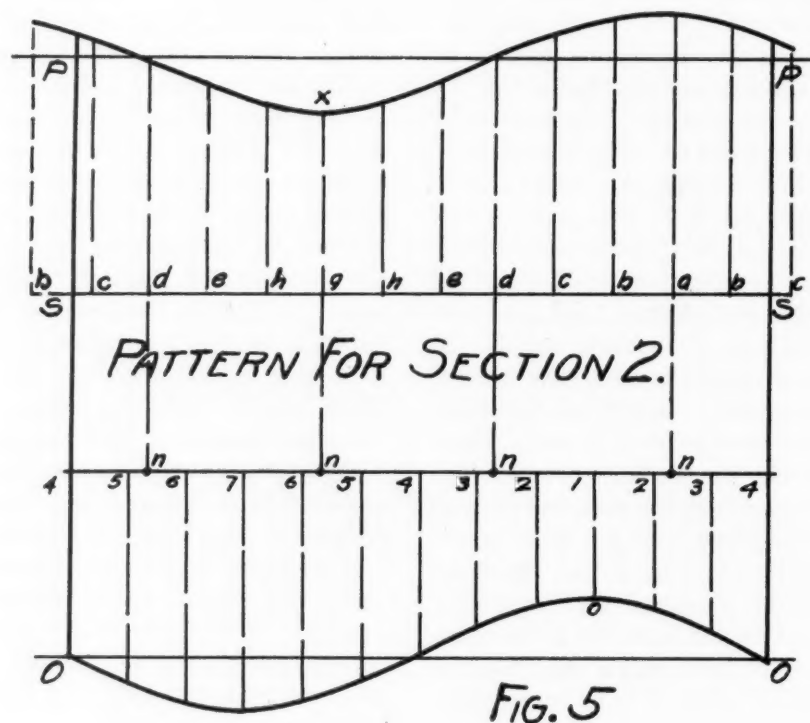
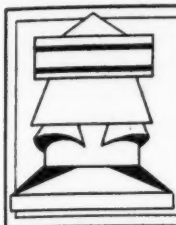
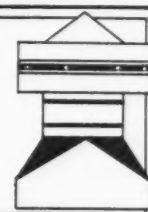


FIG. 5



GRAVITY EXHAUST VENTILATION



A Hood Exhaust System

SHOWN in the drawing which accompanies this article is the layout for a ventilating system for a cover to exhaust fumes and gases from vats or tanks. E. W. Robinson of Bridgeton, N. J., writes that he is called upon to design such systems quite frequently and wants to be sure that his system will work satisfactorily. He asks readers who do this type of work to offer any suggestions or improvements for the system.

Paul R. Jordan of Indianapolis

**The Paul R. Jordan Co., ventilator manufacturers, Indianapolis, Ind.*

By PAUL R. JORDAN*

replies with some suggestions and explanation of the principles involved. Mr. Jordan says:

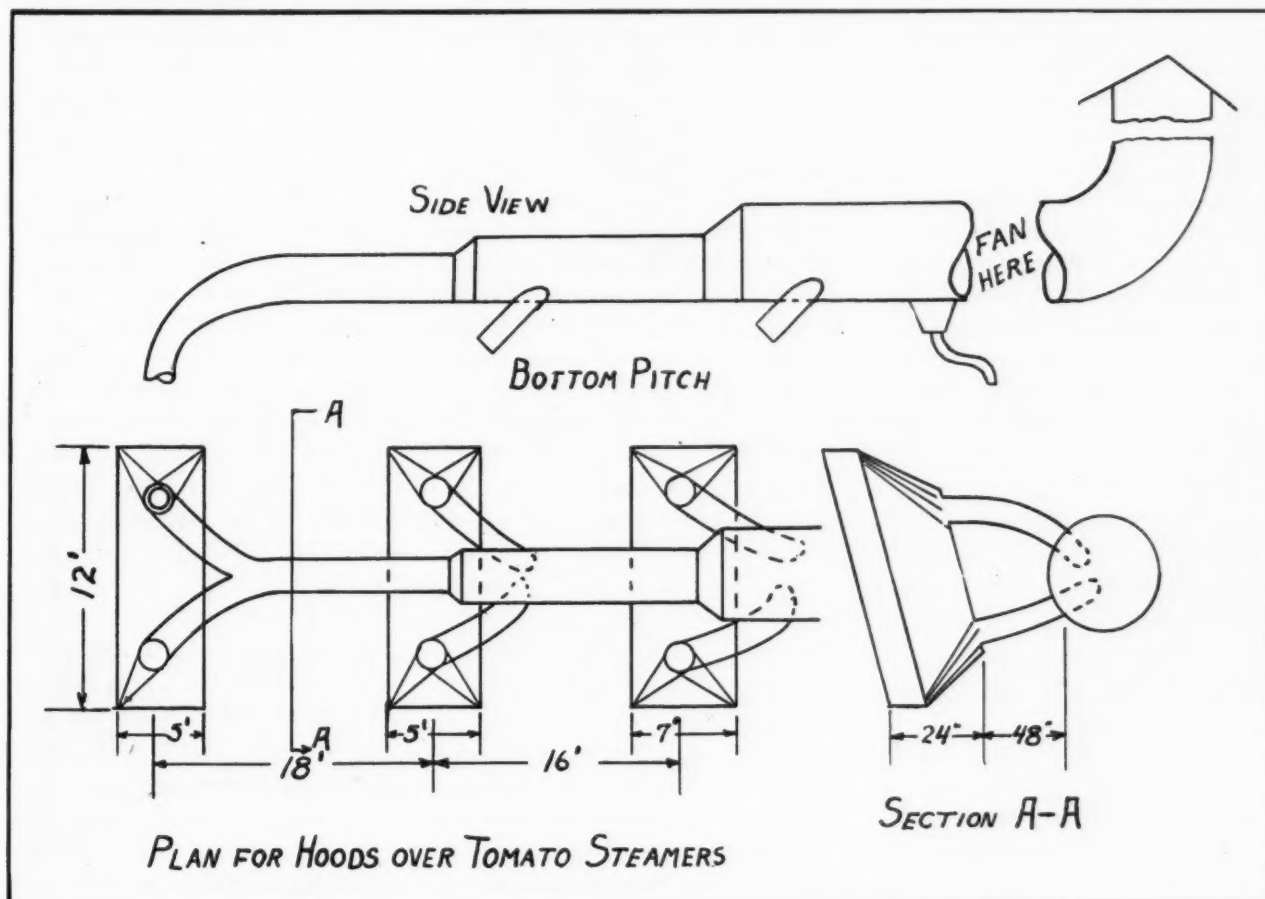
Mr. Robinson's inquiry is quite general and while I am glad to give out any general information along the line of ventilation, and welcome any opportunity of this kind to further the general cause of ventilation, I am afraid that general articles and statements are a little bit harder to understand and apply than specific ones.

Nevertheless, I believe I can give

Mr. Robinson some general information which will be usable and not ultra-technical.

Before getting into a general discussion, however, I would like to give out just one definite piece of advice and that is "On any specific job get a competent engineer to either make or else to check your layout."

In the case of the gravity or fan ventilator layout your ventilator manufacturer will be glad to furnish you this engineering layout without charge. In a layout where a blower type exhaust



fan is used, if competent engineering service is not available through the fan manufacturer, it will pay you to get Platte Overton, or some other competent engineer to make your layout. If, through lack of time or lack of funds, you cannot get Overton to make your layout, make your own layout for estimating purposes, but if you get the job have Overton lay it out for you.

Have Engineered Plan

I believe you understand that I am not making this recommendation in order to boost engineering. I am making it in order to boost quality and satisfaction in ventilation. Mr. Robinson is exactly right in wanting to install these jobs so that they will work, and it unfortunately true that many of these jobs put in by guess do not do the trade any good. I believe, moreover, that engineering is so much of a trade in itself, that it does not pay the contractor to go into it beyond the point of estimating. This is especially true in view of the fact that competent engineering services may be obtained by the sheet metal trade with little effort and at a nominal expenditure of money.

Hoods over ventilators, tanks, etc., may be connected up satisfactorily with either gravity ventilators, low pressure fans or high pressure fans. As to whether or not gravity ventilators may be used will depend first on conditions within the building, and second on the nature of the fumes that are handled. Gravity ventilators are being used very satisfactorily for this kind of work in many installations, and, I would say, are practical in the majority of cases. A rotary ventilator should be used on a gravity layout.

There are occasionally situations met with where gravity ventilators should not be used. These come in three classes. The first of these is where there are

exhaust fans, elevator shafts, stairways or something of the kind sucking the air out of the room, which will tend to make gravity ventilators backdraft. Such a condition will make an area of low pressure out of the room and the tendency is for movement of air toward low pressure. To put it in simple terms, air will rush in at any opening, so that a gravity ventilator installed on such a room would tend to let air in instead of pulling it out; that is, it would show a backdraft.

The second of these conditions where gravity ventilators should not be used is where deadly poisonous gases or fumes are being handled. With a gravity system there is likely to be a slight escape occasionally. With non-poisonous fumes, smoke or heat, this will not hurt anything, but when the gas exhaust is of a poisonous nature any escape is bad.

Watch Poisonous Gases

Under these circumstances probably the high pressure blower type fan should be used and the tank as completely housed as possible. The nature of the hood will depend on the weight of the poisonous gas as compared with air. In figuring gas weights they must be figured at the temperature at which the gas is given off, compared with air at room temperature. Manufacturers of the equipment which throws off the poisonous fumes usually have complete data covering the ventilation requirements of the equipment and processes. They are the ones from whom you can get information regarding their particular problems. This information can be worked up by a competent engineer so that the completed layout will take all of the necessary elements into consideration.

The third condition under which gravity ventilators should not be used is where the gases to be handled are heavier than air. In this case ducts should be run

to the floor and should be capped at the top with fans. Usually low pressure fans of the propeller type will handle these gases satisfactorily, and the best installation is in the form of fan ventilators.

While there are these few situations where gravity ventilators should not be used, there are a far greater number where they can be satisfactorily used. As to which type of ventilator should be used, fan or gravity, depends on several different factors, of which one of the most important is the psychology of the man who is buying the ventilation. Some of them want fans, some of them prefer gravity. Gravity has the advantage of economy and also is more flexible. By flexibility I mean it can be moved from one part of a plant to another. The objection to a fan is that it will interfere with gravity ventilation in any other part of the building. In general, it is not advisable to mix fan and gravity ventilation on the same building.

Sizing the Duct

As to duct sizes this depends on the size of the opening into the hood and not on the size of hood itself. For instance, on the sketch shown we have hoods 12 feet long and 5 feet wide. The closer these hoods can be dropped down to the top of the tank, the better. If the hoods can be dropped entirely down to the tank and work doors arranged or work openings for the workers to operate through, then excellent results can be obtained with a gravity installation, provided there is no fan interference in another part of the building. If the hood must be kept up high above the top of the tank, the best that can be done is to match up the pipes with the hood area and hope that cross currents will not carry much of the steam away before it gets up to the hood.

Figuring a hood for gravity, the pipe as compared to the hood opening (or the hood area as the

case may be) should show a ratio of not lower than 1 to 5. Where the hood has doors so as to completely close it, the pipe area as compared to the sectional area of the hood should show a ratio of not less than 1 to 10. On the case in question the hoods are 5 by 12 feet, which gives us 60 square feet as the hood area. We have no way of knowing what the opening area is so we will figure it out on the basis of hood area. One-fifth of 60 gives us 12. As there are two pipes, each pipe should have an area of 6 square feet. If the sides of the hood were dropped down, one pipe could be used in place of two. If the hood is completely closed with doors, one pipe with 6 square feet of total area will take care of the 60 square feet of hood.

I know that some will say that my figures are excessive, but I call attention to the fact that many hood jobs are unsatisfactory and that in practically every case the fault lies with the improper ratio of pipe area to hood area. In other words, the pipe is too small to take care of the hood. In this case if gravity is used and the building is one-story, a separate ventilator may be used for each hood with considerable economy and with much better results. If a long horizontal main has to be used it is

best not to depend on gravity.

If a fan ventilator can be used then all duct areas may be cut in two. In other words, a 10 to 1 ratio can be used for an open hood, or a 20 to 1 ratio on a closed hood. By a closed hood, I mean one which is completely closed and on which one door will be open at a time.

As to duct sizes in case the high pressure blower type is used, I will leave that for Platte Overton to figure. I will say, however, that unless there is fan interference in some other part of the building, this job can be handled more economically by gravity or by a fan ventilator installation than by high pressure. A gravity installation will probably run about the same as a fan ventilator in installation in first cost on a one-story building. If the building is more than one story, probably the fan ventilator will figure somewhat less in initial cost. The initial cost of either of these will be somewhat lower than the cost of the high pressure job. The gravity system will entail no upkeep which is an important item on an installation of this kind, where excessive moisture may cause more or less trouble with motors and insulation if a propeller fan is used. The operating cost of the low pressure fan is considerably lower than of the

high pressure, based on air turnover, and service expense is likely to be somewhat less. If there is likely to be more or less acid in the condensate, everything connected with the system should be painted with acidproof paint.

I notice a drip at the far end of the main has been provided for in the drawing. I would be interested to know what objection there is to this condensate running back into the tanks. It is certain that, according to the layout, the condensate from the hoods, pipes and a portion of the main will drip back into the tanks anyhow. I am interested to know this because Mr. Robinson's inquiry displays considerable intelligence and he doubtless has some good reason for putting this drip at this point. If I were figuring to take care of the condensation in this manner the location of the drips would depend on information I do not now have.

I presume that the problem presented by Mr. Robinson here is more or less of an academic one, but I trust that it has served to bring out some points of interest and value. Jobs of this kind are being met with more and more in industrial work, and it is a matter of prime importance not only to the contractor himself but to the trade as a whole, that they shall be handled effectively.

FAN BLAST ENGINEERING

16 issue of the AMERICAN ARTISAN.

Note on factor 48.96

$$0.24 \times (t_1 - t_2) \times 60 \times 0.068$$

.24 = specific heat of air (one pound).

Our problem is in pounds of air and we multiply it by the final 0.068 to change it into C.F.M.

Items 28 to 32 inclusive are for steam systems and are not under consideration in these articles.

Item 26 is recirculation C.F.M. This may be any amount of air

(Continued from page 38)

from 10 per cent to 100 per cent of the supply by weight.

We must calculate the difference in weights as our inlet temperature will vary from 80 to 120 degrees, depending on the outside temperature, and our return air will be fairly constant at 60 to 65 degrees.

One pound of air at 120 degrees weighs 0.068.

One pound of air at 60 degrees

weighs 0.076.

0.068 divided by 0.076 equals 89.4. Hence if our supply is 1000 C.F.M. our recirculation (100 per cent) becomes 1000 times 89.4 equals 894 C.F.M. or if 50 per cent is recirculated 894 divided by 2 equals 447 C.F.M.

Our next item is 27 and is air supply inlet temperature.

Where we use the factor 48.96 our inlet temperature is 120 de-

(Continued on page 47)

CAN YOU TELL ME?

"Reed" Air Filter

From Keith Furnace Company, Des Moines, Iowa.

Who makes the Reed filters for warm air furnaces?

Ans.—American Air Filter Company, Inc., First and Central Avenue, Louisville, Kentucky.

"Eureka" Soldering Salts

From J. H. Barnett, Dodge City, Kansas.

Where can we get "Eureka" soldering salts wholesale?

Ans.—Grasselli Chemical Company, 2101 Canalport Avenue, Chicago.

Portable Combustion Test Sets

From Homer Selch, Indianapolis, Indiana.

Where can I get a portable combustion test set for flue tests?

Ans.—The Hays Corporation, Michigan City, Indiana.

Second-Hand Spot Welding Machine

From E. Herbert Jackson, Burlington, Iowa.

Where can I purchase a second-hand spot welding machine for light iron, 22 gauge and lighter?

Ans.—International Machine & Tool Works, Inc., 642 West Division Street, Chicago, Illinois.

Retinning Milk Cans

From W. Levin, Hammond, Indiana.

Where can I get equipment for retinning milk cans?

Ans.—Retinning Manufacturing Company, 3021 Greenview Avenue, Chicago, Illinois; Hopwood Retinning Company, Chicago Heights, Illinois.

Oil Storage Tanks

From Farrow Sheet Metal Company, Oshkosh, Wisconsin.

Where can we get a 250 gallon oil storage tank, the kind used for residence oil burners?

Ans.—Chicago Steel Tank Company, West 66th and South Narragansett Avenue Clearing, Chicago, Illinois.

Aquarium Cement

From Homer Sheet Metal & Plumbing Works, Homer, Louisiana.

Who makes a good aquarium cement?

Ans.—Wm. Connors Paint Manufacturing Company, Troy, New York; Chicago Distributor, J. L. Perkins, 148 South Dearborn Street.

Retinning

From W. Levin, Hammond, Indiana.

Where can we get equipment for retinning milk cans?

Ans.—Retinning Manufacturing Company, 3021 Greenview Avenue, Chicago, Illinois, and Hopwood Retinning Company, Chicago Heights, Illinois.

Automobile Radiator Supplies

From West Akron Sheet Metal Company, Akron, Ohio.

Where can we get automobile radiator supplies?

Ans.—F. L. Curfman Manufacturing Company, Maryville, Missouri; Faber-Schneider Radiator Company, 2317 South Wabash Avenue, Chicago, Illinois.

Automobile Fenders

From West Akron Sheet Metal Company, Akron, Ohio.

Where can we get automobile fenders?

Ans.—Herman Z. Cutler Company, Inc., Camden, New Jersey; Mullins Manufacturing Corporation, 1018 Mills Street, Salem, Ohio.

"Anti-Freeze" Water Filter

From Adelsman Heating & Sheet Metal Works, Fergus Falls, Minnesota.

Who manufactures the new "Anti-Freeze" Water Filter?

Readers.—Can you supply this information?

Kerosene Blow Torch

From Beatrice Creamery Company, Davenport, Iowa.

Where can we get a kerosene operated blow torch?

Ans.—Geo. W. Diener Manufacturing Company, 400 Monticello Avenue, Chicago, Illinois.

Copper Pipe

From Geo. R. Baker, Alpena, Michigan.

Where can I get copper pipe tinned on the outside, to be used in dairying?

Ans.—American Brass Company of Illinois, 1306 West Washington Street, Chicago, Illinois.

Metal Columns for Pergolas

From Mr. Meyer, Chicago, Illinois.

Where can we get metal columns for pergolas?

Ans.—Union Metal Manufacturing Company, Canton, Ohio. Chicago Office; 230 South Clark Street.

Light Tinner's Ladder

From Chas. H. Kerr & Company, Nokomis, Illinois.

Where can we get a good light ladder for tinner's use?

Ans.—J. M. & L. A. Osborn Company, 1541-51 East 38th Street, Cleveland, Ohio.

Repairs for "Triumph" Range

From C. D. Lyford, Frazee, Minnesota.

Where can we get repairs for the "Triumph" kitchen range?

Ans.—Northwestern Stove Repair Company, 662 Roosevelt Road, Chicago, Illinois.

Square Pipe and Fittings

From Leonard Hendriksen, Flint, Michigan.

Who manufactures square pipe and fittings for forced air heating.

Ans.—F. Meyer & Bros. Company, Peoria, Illinois; Milcor Steel Company, Milwaukee, Wisconsin.

Humidifiers

From F. B. Straukamp, Nyack, New York.

Who manufactures humidifiers?

Ans.—Automatic Humidifier Company, Cedar Falls, Iowa; Sallada Manufacturing Company, 720 South Fourth Street, Minneapolis, Minnesota; J. L. Skuttle Manufacturing Company, Dowagiac, Michigan.

ASSOCIATION ACTIVITIES



Moncrief Dealers Assn., at Cleveland, Hold "House Party"

The March meeting of the Authorized Moncrief Dealers Association of Cleveland was made the occasion of a "house party" given by the Independent Register & Manufacturing Company at the latter's factory. The shop was in operation during the evening so that the members might be shown the processes of manufacture of Fabrikated cold air faces and registers.

After inspecting the factory, the members were addressed by Blair Quick, sales manager of the Independent Register & Manufacturing Company.

He emphasized the fact that the woman of the house is interested in appearances always and the only part of a furnace installation that shows is the registers and cold air faces.

According to Mr. Quick we are living in a style era, and the majority of registers in use today were installed before people were thinking of house furnishings and fittings in terms of color. It is up to the furnace dealers to show house owners what modern registers are and how they improve the appearance of the home.

H. S. Sharp, vice-president and sales manager of the Henry Furnace & Foundry Company, followed with remarks along the same line. He pointed out that the warm air furnace man has never had such opportunities for developing his business as right now.

Furnace casings as well as registers are being styled, he continued. Color is in demand because it creates individuality and stimulates sales. Casings are now finished in bright red and aluminum and apple green, because it has been proved beyond all doubt that furnaces so finished sell easily and can be sold at a profit.

Forced air circulation is gaining by leaps and bounds. The recent developments in blowers do away with every least objection by eliminating noise completely. Forced circulation and automatic humidification give the furnace man talking points that enable him to widen his field of operations far beyond what he ever dreamed of. He need not be on the defensive but can go out after radiator systems and beat them in every way, including price.

E. D. Wolaver of the Hubbell Advertising Agency, which handles the advertising of both firms, also addressed the meeting. He cautioned dealers to make their sales stories fully understandable by the average man and woman. The tendency of most dealers is to assume that the prospect knows more about heating than he really does.

Indiana Contractors Plan Summer Picnic

Members of the Fort Wayne Association of the Indiana Sheet Metal and Warm Air Heating Contractors' Association are planning a district picnic at which the local group will act as host to fellow members from the northern half of the state.

The date of the event has been set for June 21.

Frank De Weese, Fort Wayne, has been appointed general chairman and he has named on his general committee the following: H. J. Furge, K. H. Baker, William Hugenard, Ed Albright, Charles Rundell, C. L. Schust, all of this city, and Harry Beeman, Indianapolis, state president of the Sheet Metal Association, and Harry Jones, Indianapolis, president of the Furmetts.

Other committee appointments announced by Mr. De Weese are as follows: Location committee, Harry Jones, Indianapolis, Virgil Roland, Elkhart, and Ed Albright, this city; horseshoe, Fred Wilkening, Indianapolis, chairman; baseball, C. C. Sieb, this city; J. Harris, South Bend, and Ken Stokes, Warsaw; swimming, Paul Jordan, Indianapolis; games for ladies, George C. Joslin, Indianapolis, and all Fort Wayne ladies; games for children, William Hugenard, chairman, this city, and Homer Selch, Indianapolis; prizes, Charles Rundall and C. I. Schust, this city; transportation and route, H. J. Furge, this city, chairman; publicity, C. L. Schust, Harry Jones and William Koeneman; finance, Tom Ewing, Huntington, and A. Ashbacker; reception, V. Roland, Elkhart, Elmer Livezey, Newcastle, Darl Swisher, Richmond, Blont Slemmer, Warsaw, Art Van Rie, Mishawaka, J. C. Gardner, Indianapolis, Joe Mattingley, Indianapolis, Wilbur Woodward, Marion, Ken Rickets, Anderson, Harry Werbe, Kokomo, Don Van Fliet and Charles Lumm, Garrett, Al Hope, Goshen, and John Bamlka, Lafayette.

FAN BLAST ENGINEERING

(Continued from page 45)

grees. Where the state law fixes the requirement we derive the inlet temperature from the formula:

$$\text{Inlet temp.} = \frac{\text{B.t.u. loss}}{\text{C.F.M.} \times 1.07} \text{ plus room temp.}$$

Hence if we have a room with 1200 C.F.M. required and our B.t.u. loss is 20,000 we have

$$\frac{20,000}{1200 \times 1.07} + 70 = 85.5$$

for our inlet temperature.



American Oil Burner Association—April 13 to 18, at Ben Franklin Hotel, Philadelphia, Pa. Harry F. Tapp, Executive Secretary, 350 Madison Avenue, New York, N. Y.

New York State Sheet Metal Contractors' Association—April 15 and 16, at Powers Hotel, Rochester, N. Y. Dayton Hessler, Secretary, 913 North State Street, Syracuse, N. Y.

National Warm Air Heating Association—April 22, 23, at Deshler-Wallick Hotel, Columbus, Ohio. Allen W. Williams, Managing Director, 3440 A. I. U. Building, Columbus, Ohio.

Western Hot Air Club—May 11, at Chicago. Semi-annual Pow-Wow. J. Harvey Manny, Chairman Entertainment Committee, 213 W. Austin Avenue, Chicago.

National Association Sheet Metal Contractors—May 13 to 15, at Congress Hotel, Chicago, Ill. A. B. Rysdon, Secretary, Associated Sheet Metal Employers of Chicago, 350 North Clark Street, Chicago.

Sheet Metal Contractors' Association of Illinois—May 12, at Congress Hotel, Chicago. Chas. L. Radtke, Secretary, La Salle, Ill.

Travelers Auxiliary to the Sheet Metal Contractors' Association of Illinois—May 12, at Congress Hotel, Chicago. E. Cohn, Secretary, 6756 Crandon Avenue, Chicago.

National Association of Sheet Metal Distributors—May 20 and 21, at William Penn Hotel, Pittsburgh, Pa. George A. Fernley, Secretary-Treasurer, 505 Arch Street, Philadelphia, Pa.

NEW ITEMS and NEWS ITEMS

From and about the Manufacturers and Jobbers

Irving L. Jones Elected International Heater President

Irving L. Jones, formerly treasurer of the International Heater Company, has been elected president of the company to succeed the late Frank E. Wheeler. Beecher M. Crouse has been chosen a director to fill the vacancy caused by the death of Mr. Wheeler.

Other new officers elected, all of whom have been with the company for many years, are: Miss Mary J. Beggs, comptroller; Robert L. Griffiths, secretary and treasurer, and Harry A. Chester, assistant secretary and treasurer.

Polk Mfg. Co. Makes Combination Draft Regulator

The Combination Draft Regulator, manufactured by the Polk Manufacturing Company of Madison, Wisconsin, serves the double function of a draft regulator and cleanout door when placed in the lower part of the chimney.

The device consists of a cast iron frame with holding lugs which secure it in place in the opening at the bottom of the chimney formerly occupied by the cleanout door. A cast aluminum door is mounted in the frame, which opens with a slight change of draft. Thus the cold air admitted keeps the draft uniform at all times.

Draft intensity is regulated by means



of a small handle on the front of the unit. This may be moved from a low to high position to suit local conditions. By swinging the door upward and forward the central portion may be lifted from the frame so that any accumulation in the bottom of the chimney can be removed as with the former cleanout door. The regulation of the unit is not affected by so doing.

As this regulator is out of the gases, away from intense heat, yet at the point of highest draft in the chimney, it is said to be a most effective fuel saver.

Earl A. Tanner Becomes General Manager of Canton Plant, Milcor Steel

The Milcor Steel Company announces the appointment of Earl A. Tanner as general manager of the Canton, Ohio, plant.

Mr. Tanner, the new general manager, went to the Milcor plant at Canton as sales manager some six months ago. Before that transfer he was manager of jobbing sales for the Milcor Steel Company with headquarters at the Milwaukee plant. During the ten years of active work calling on jobbers, Mr. Tanner developed a wide acquaintance among many



of the most prominent men in the industry.

Under Mr. Tanner's supervision the facilities of the Canton plant will be extended to offer the highest class of service on Milcor products throughout the entire Eastern territory.

Together with this announcement comes information on the enlargement and development of Milcor's Canton plant. During the past year new buildings and machinery have been added which will enable this unit to produce within its own walls practically all of the many Milcor building products, including various kinds of metal lath, specialty products, etc. The offices have been rearranged for increased efficiency and new men have been added for improved service.

A. F. Rich has recently been appointed to Mr. Tanner's former position of manager of jobbing sales.

Roy L. Jones Opens Chicago Sales Office

The Roy L. Jones Steel Company, 3132 West 51st St., Chicago, announces the establishment of offices and warehouses where Roy L. Jones will carry, at all times, complete stocks of strictly prime quality galvanized, black and blue annealed sheets—also tin and terne plates and will deeply appreciate hearing from all his friends when they require anything in sheet steel, in plate or coated and lacquered sheets. Both carloads and LCL can be handled for direct mill shipment from Chicago and Pittsburgh districts.

W. H. Maze Company Making New Roofing Nail

The W. H. Maze Company, Peru, Ill., is now distributing a new roofing nail under the trade name, "Zinclad."

The features of the nail are that it holds like a screw, has a soft head for sealing the hole, is easy to drive, the head can't come off as the nail is one-piece, and the nail is rust-proof.

The nail is provided with a mushroom head made in cone shape which



squashes down when the nail is driven. The lower half of the nail has a twisted screw formation which causes the nail to turn into the material like a screw as it is driven. This is said to greatly increase the holding power.

The entire nail is heavily coated with pure zinc by a hot dipping process so that it will not rust.

Interested contractors can get an illustrated folder by writing the company.

Rockford Sheet Steel Co. Stages Interesting Dinner

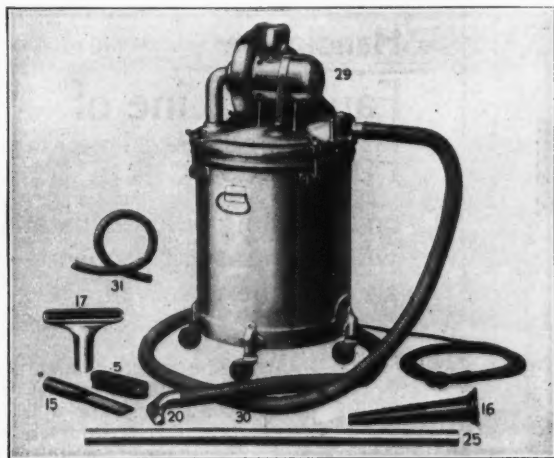
On March 3, the Rockford Sheet Steel Company, Rockford, Illinois, gave a sheet metal dinner to about 50 of the most prominent sheet metal men of the city.

Mr. George Steck of the Toncan Division of the Republic Steel Corporation was the principal speaker. He gave a very interesting address on the manufacture of Toncan Iron.

An excellent dinner was served the guests in the Bloomquist Grill.

Breuer Electric Co. Making a New Portable Cleaner

The Breuer Electric Company, 865 Blackhawk Street, Chicago, announces the manufacture of a new vacuum cleaner designed especially for furnace cleaning.



The new cleaner will be marketed under the trade name—Tornado Furnace Cleaner. One of the features of the cleaner is the light weight, being about 30 pounds.

The cleaner is designed to be handled by one man without the use of a helper. The cleaner has an oversized $\frac{3}{8}$ horse-

power motor mounted on ball bearings.

The dust tank is built of steel with an aluminum cover and holds ten gallons. The complete unit is mounted on easy running castors. The arrangement of the units places the tank on the castors

with the motor and nozzle for attachments at the top.

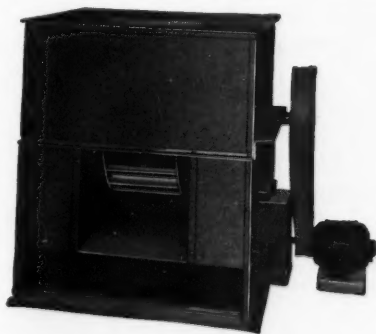
A complete assortment of attachments comes with every cleaner. These attachments are shown in the illustration.

Literature describing the new cleaner and giving prices will be furnished anyone writing the company.

Autovent Fan and Blower Co., Making Furnace Blower

Autovent Fan and Blower Company, 1805 N. Kostner Ave., Chicago, are now making a new blower designed especially for warm air heating installations.

The manufacture of fans and blowers by Autovent has been carried on



for the past twenty-five years and the company states that all the experience gathered during this long period has been incorporated in the new unit.

The Autovent furnace blower is equipped with manual control for operating the circulating damper and motor. The action of the circulating damper on Autovent furnace blowers is positive.

The electrically controlled Autovent furnace blower is a synchronized unit, entirely automatic in operation. It embodies the circulating damper, same as in the manually controlled blower, which closes automatically when blower is operating and is opened as soon as blower stops, so as to provide ample free area for gravity operation.

Autovent furnace blowers embody a unique re-circulating damper arrangement which provides approximately $33\frac{1}{3}$ per cent greater free area for gravity operation as compared with units that are not equipped with damper control. Consequently, the free area through Autovent furnace blowers very nearly approaches the area of the piping system and insures a well balanced installation.

The air delivery of all Autovent units is guaranteed.

Contractors interested can get full details from the manufacturer.

Lennox Furnace Co. Mailing Folder on Econotrol

The Lennox Furnace Company, Marshalltown, Iowa, and Syracuse, N. Y., are now mailing out a large two color, illustrated folder explaining and showing the company's new Econotrol automatic heat control equipment. The leaf-

let explains what the equipment is and how it operates.

The Econotrol consists of a Minneapolis-Honeywell relay, electric thermostat and control switch, a limit control for the bonnet and the Econotrol unit which is a blower and motor mounted on a door. This door replaces the old door of any Torrid Zone furnace manufactured in the last eight years. The equipment has been developed to make it possible to burn buckwheat anthracite.

For dealers all the equipment is provided on a large display board which can be placed in the show room or window or taken in the canvassing car. The board comes so arranged that the equipment can be plugged into a light socket and operated for demonstration.

Symonds Register Company Publishes New Catalogue

The Symonds Register Company, 3117 Minnesota Ave., St. Louis, have ready for distribution a new catalogue showing their complete line of registers and grilles.

The catalogue is a complete index of the company's products showing the various items with complete details for each unit.

Cross section details showing construction and list prices for the units are contained in the booklet.

Any one wishing a copy of the catalogue for reference can get a copy by writing the company.

Revere Copper Moves Departments to New York

The Executive, General Sales, and Advertising departments of Revere Copper and Brass, Incorporated, are now located in the New York Central Building, 230 Park Avenue, New York City, instead of at Rome, New York.

The officers of the company who will now make New York their headquarters are C. Donald Dallas, President; George F. Stanton, Vice-President and General Sales Manager; and J. A. Doucett, Vice-President and Assistant General Sales Manager.

The Treasurer's office and General Accounting department will remain in Rome, New York.

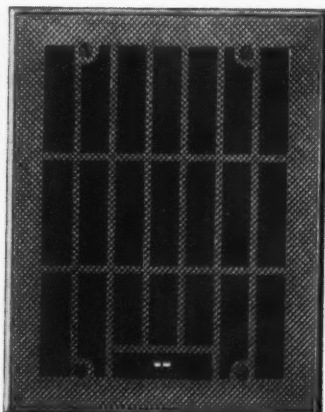
Correction

In the March 30 issue we published a notice saying that the Warm Air Furnace Fan Company, Cleveland, had organized a Canadian company.

This statement is incorrect in that there is no connection between the two companies. The Canadian company is an independent organization.

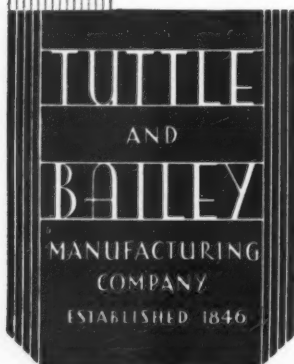
he STANDARD OF COMPARISON SUPER-REGS

Style 80
Cobble
Register



There must be some reason why "Super-Regs" have been copied so much. But the most clever imitation of design, color or even mechanical features cannot replace the underlying unvarying quality that has made "Super-Regs" the standard of comparison.

Baseboard registers (one or two pieces)
—Side Wall registers—Floor type registers—"Cobble" Cold Air Faces . . . each has its identifying name, but all are "Super-Regs" . . . finished in many standard colors and neutral tones or in the famous exclusive T. & B. "Tanbo" finish, for harmony with interior decorative plans. All are made to satisfy the same unyielding standards of design, construction and workmanship—every one a testimonial to the leadership of Tuttle & Bailey in the industry since 1846.



TUTTLE & BAILEY
MANUFACTURING CO., INC.
441 Lexington Avenue
New York City

Offices in Boston, Chicago,
Kansas City, Los Angeles

TRUE TO THE NAME—"FAULTLESS"

Handle the Faultless Line of Furnaces

and handling volume installations
will be your next problem—
an easy one to solve

The most dominating line of furnaces on the market. Four new series . . . every one a leader in its field. Familiarize yourself with the Faultless line . . . write for dealer proposition.

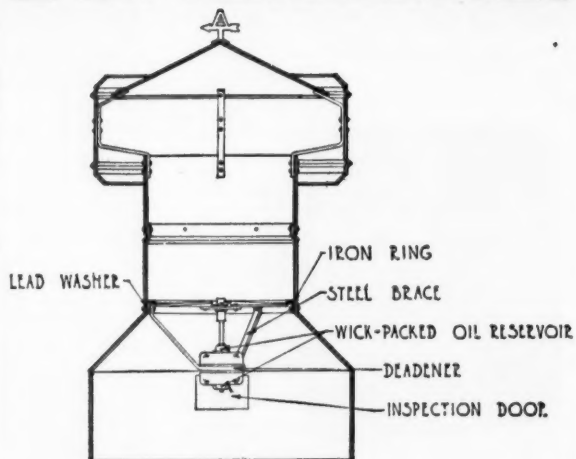
THE GRAFF FURNACE CO.

SCRANTON, PENNA.

New York City Sales Office: 116-118 Wooster Street

JORDAN AERO VENTILATION

F-DIRECT CONNECTED-FAN VENTILATOR



A Unit for greater efficiency.
Combining gravity, ventilator and fan action.
Eliminating wind and weather hazard.

Backed by a complete engineering service

PAUL R. JORDAN & CO.
630 South Delaware St. Indianapolis, Ind.

Say you saw it in AMERICAN ARTISAN—Thank you!

INSTALL FURNACES OF BUILT-IN QUALITY

THE surest means of building a substantial business and many satisfied customers is to present and sell merchandise of quality throughout, or of "built-in" quality. PEERLESS dealers found this out years ago. They have a built-in quality furnace to fit every type of job. Are you so situated?

PEERLESS BUILT-IN QUALITY

Let's take one of the Peerless line—THE PEERLESS BOILER PLATE. Here is a furnace of built-in quality, engineered to give satisfaction, containing more built-in quality features than any steel furnace on the market. A few of them are the Automatic Damper Control, an exclusive feature—Locomotive or Ball Bearing Duplex Grates—Interlocking Collars—Extra Heavy Crescent Shaped Radiators—down draft combustion. These are only a few, but we believe the greatest feature of all is the PEERLESS MERCHANDISING—"Local Survey of your Community."

Think it over. Are you lined up right? Have you everything in your favor? Let us tell you about the complete built-in quality PEERLESS line and PEERLESS merchandising co-operation. Write for details.

THE PEERLESS FOUNDRY COMPANY, Inc.
INDIANAPOLIS, INDIANA

Bailey Farrel Mfg. Co.
Warehouse Distributors
Pittsburgh Pa.



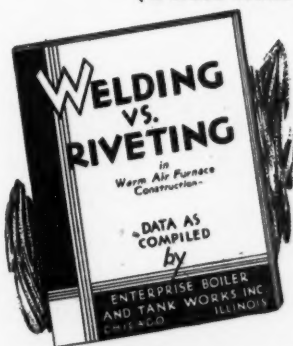
Peerless Boiler Plate is only one of the Peerless built-in quality line. Of course, there is the Peerless Pleasant Home, a competitive priced steel furnace—and the Peerless built-in quality Cast Iron at a price that gets the business.

Comparative Strength of RIVETED JOINTS and WELDED JOINTS in Warm Air Furnace Construction as given by AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Riveted Joints . . . 47.7

Welded Joints . . . 90.

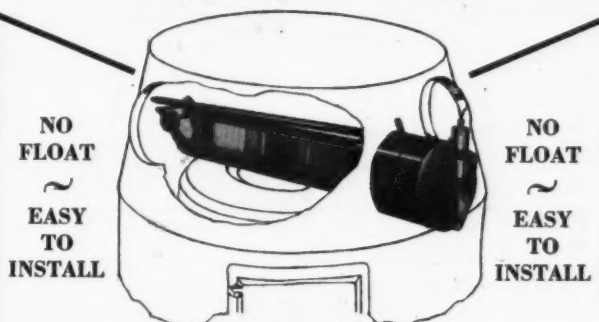
(Welded inside and outside)



Read all about it in this
FREE BOOKLET—
write today for your copy.

Learn why Double
Welded PURE AIR
HEATERS are Better
furnaces.

ENTERPRISE BOILER & TANK WORKS
1955 North Long Avenue Chicago, Ill.



NO
FLOAT

EASY
TO
INSTALL

NO
FLOAT

EASY
TO
INSTALL

SIMPLEX HUMIDIFIER

"Truly Automatic"

Here's the Humidifier you should sell. No float to get out of order. Evaporation controls water flow. Easy to install. Adopted as standard equipment on many furnaces.

Write for our dealer, jobber or
manufacturer proposition

SALLADA MANUFACTURING CO.
720 South 4th St., Minneapolis, Minn.



"SIMPLEX"
Truly Automatic—

Say you saw it in AMERICAN ARTISAN—Thank you!

The SHEET METAL WORKER *Knows*

PEXTO Machines and Tools

are the standard of the industry. They know that they can turn out more work at lower cost than with any other equipment. More production in less time and labor means just one thing—More Profit.



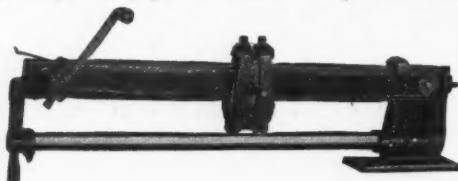
SQUARING SHEARS

No. 137 Model; Capacity 18 gauge or lighter; sturdy construction; operates easily with foot treadle; length for sheets 36"; used as standard equipment in hundreds of shops and trade schools.



CRIMPERS

No. 581; a direct acting crimper which can be depended upon to make uniform crimp and bead or crimp only, in pipe of black or galvanized iron.



GROOVERS

No. 518; speedy in operation; permits worker to stand in one position for inserting and removing; groove work length up to 30".



For Information Consult Your Service Dealer

THE PECK, STOW & WILCOX CO.
Southington, Conn.

The Circles Tell the Story

ORDINARY Cupola Iron

Magnified 150 Times

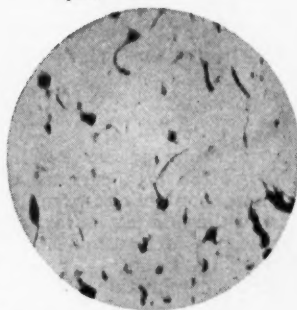


The photomicrograph at the left shows Cupola Iron magnified 150 times, illustrating conclusively why this type of metal has weak spots. Note the black spots. That is the free carbon present. Remember no metal is stronger than its weakest spot.

'LECTROMELT Processed Iron

Magnified 200 Times

The photomicrograph at the right shows 'Lectromelt Iron magnified over 200 times. Very little free carbon is apparent. Note the density. Even strength throughout. Superior castings are always assured by the 'Lectromelt process.



A Complete Line of Furnaces

ALL 'LECTROMELT PROCESSED

Write for details

BRILLION FURNACE COMPANY
BRILLION, WIS.

Champion
PRODUCTS

**SEAMED MITRES
and ENDS**
as DURABLE
as the
WELD!

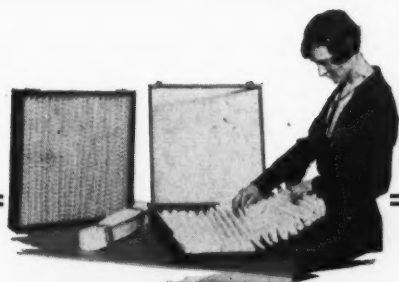
TUBE B END E

END D + END C = END A

The BEST EAVES TROUGH MITER IN THE

BRADEN MANUFACTURING CO.
TERRE HAUTE, INDIANA

Say you saw it in AMERICAN ARTISAN—Thank you!



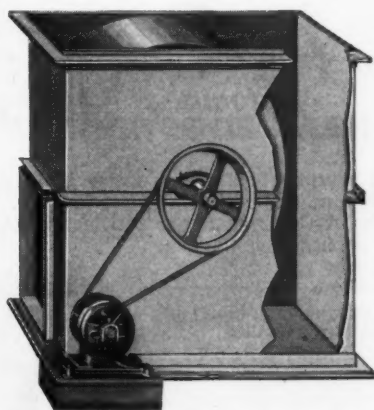
—“KRIMPAK”— AIR FILTER

WILL BE ON DISPLAY
ROOM 1565
DESHLER-WALLICK HOTEL
COLUMBUS, OHIO

During the
**NATIONAL WARM AIR HEATING
CONVENTION, April 22-23**

where our President, J. L. Harpham, will
gladly demonstrate KRIMPAK—the newest
and most practical air filter ever designed for
use with warm air heating systems.

INDEPENDENT AIR FILTER CO.
29 South Clinton St. Chicago, Illinois

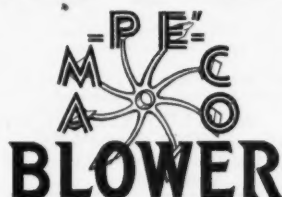


The ACE of All Forced Air Circulators for Your Heating Jobs

AM-PE'-CO has revolutionized air circulator construction
and efficiency. The only blower that positively provides
a fully balanced distribution of air to the rotor—vital to proper blower opera-
tion. Patented improvements assure positive, uniform heat delivery. Mechan-
ically controlled; compact; quiet; non-leaking ring oil bearings. A big business
builder and profit maker for the dealer.

Built with or without dampers which open automatically when the blowers
stop, for gravity circulation. Get more blower business for yourself—write us
for literature on Am-pe'-co Blowers, and full information.

AMERICAN MACHINE PRODUCTS COMPANY
Marshalltown, Iowa
For 15 Years Manufacturers of Precision Products



Mention AMERICAN ARTISAN in your reply—Thank you!

THE AKRON AIR BLAST and ATH-A-NOR AIR CONDITIONING UNITS

Sell “AIR CONDITIONING!”

Today as never before
purchasers of warm air
heaters are demanding
Air Conditioning. Give
the customer what he
wants. Install a com-
plete *Air Conditioning*
heating device. Make it
an Ath-A-Nor or Akron
Air Blast—the units
that clean, purify and
moisten the warm air
used in winter, and
cool it in the summer.
Cash in on public de-
mand.

Write today for information on the
Ath-A-Nor and *Akron Air Blast Air*
Conditioning Units. Let us tell you
about our profit making franchise
and the complete May-Fiebeger line.

The May-Fiebeger Co.
NEWARK
OHIO

A Good Furnace Made Better
A Price That Defies Competition

that's the---

RYBOLT FURNACE

DURING the past quarter century the RYBOLT has won an enviable reputation for utmost reliability—a factor that has led to thousands and thousands of satisfactory installations.

Now . . . with the addition of important improvements; a one-piece radiator, of uniform thickness, with smoke and cleanout collars cast on; a competitive price, made possible only by RYBOLT'S quantity production and modern manufacturing methods . . . the New 1931 RYBOLT offers unequalled opportunities to dealers desiring to increase sales by giving prospects their "money's worth."

If you haven't already asked for details of our interesting proposition, write now—no obligation.



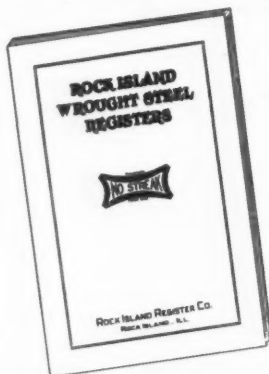
THE RYBOLT HEATER COMPANY

Ashland, Ohio

Cincinnati

Indianapolis

Just Out



This
NEW
complete
catalog

NO. 10

of

**ROCK ISLAND
REGISTERS AND GRILLES
FURNACE SUPPLIES, ETC.**

----- Send This Coupon -----

ROCK ISLAND REGISTER COMPANY
Rock Island, Illinois

Send me your catalog just off the press.

Name.....

Street..... City..... State.....

THE
UNIT
TO
SELL

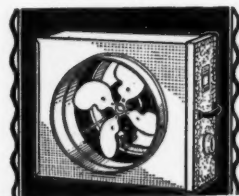
A-C
*Thermostatically
Controlled*
Automatic
HEAT BOOSTER

MAKES
EVERY
INSTALLATION
BETTER

Here's a unit which makes every installation a better one and makes a profit for you. Install the A-C for customer satisfaction and a better profit.

WRITE FOR DESCRIPTIVE CATALOG
AND NAME OF NEAREST
JOBBER

A-C Manufacturing Co.
417 Sherman Ave., Pontiac, Ill.



WESTERN

Let the ever-growing reputation of Western Steel Furnaces increase your sales.
Write for Catalog No. 31 showing the new Western GAS Furnace.

**WESTERN STEEL
PRODUCTS COMPANY**
130 Commonwealth Ave.
Duluth, Minn.

Say you saw it in *AMERICAN ARTISAN*—Thank you!

THE
"BIG THREE"
 IN
 AIR CONDITIONING

SILENTAIR FAN
 (Blower Type)
 SILENTAIR AIR WASHER
 SILENTAIR AIR FILTER

Write for Literature

SILENTAIR
 AIR CONDITIONING UNITS

Manufactured by

A. GEHRI & CO.
 Tacoma, Washington

DISTRIBUTORS IN ALL PRINCIPAL CITIES

*Do You Want the Best
 In Furnace Cement?*

THEN ORDER:—



"Set your next job with 'Lastik'"

LASTIK PRODUCTS CORPORATION
 OLIVER BUILDING / / PITTSBURGH, PA.

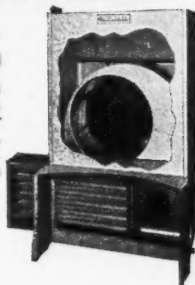
KORECTAIRE
The CORRECT AIR MACHINE
 for
COOLING

Do you realize that hundreds of dealers are making big profits selling blowers and fans on the basis of Home Cooling during the summer as well as Forced Heat in winter. They are, and "KORECTAIRE" is ideal for such sales. It is a positive pressure blower—it humidifies the air and cleans it.

Write for full details today

The KORECTAIRE is the most quiet blower on the market—it is the easiest to install—it lends itself to any number of cold air returns. Ask for illustrated circulars and prices now.

WATT MFG. COMPANY STERLING, ILL.



Balanced Heat
 Is the *Ideal* Method
 of Home Heating

THE McIlvaine Oil Burner, with its continuous flame, automatically governed, maintains a uniform temperature in the home, regardless of outside weather conditions. Thermostatic control automatically governs the flow of both oil and air.

The house is not alternately overheated and chilled, because the McIlvaine Continuous Flame is automatically adjusted to a size that will maintain an even temperature at all times. There is no pilot light—no electric ignition—no intricate starting and stopping device to get out of order. There is no waste through alternately forcing the heating system and cooling it off again.

SEE OUR DISPLAY

At the American Oil Burner Association Convention, Philadelphia, April 13th to 18th, Booths 98 and 99.

McILVAINE
 BURNER CORPORATION

747 Custer Avenue, Dept. A, Evanston, Ill.



*Write for This
 FREE BOOK*

which explains the McIlvaine method of Balanced Heat—the McIlvaine 1931 Sales Plan and special proposition to dealers in territory where we are not represented.

MAIL THIS COUPON!

McILVAINE BURNER CORPORATION,
 747 Custer Ave., Dept. A, Evanston, Ill.

Send me, without obligation, your book, "Balanced Heat"—Sales Plan and proposition to dealers.

Name _____

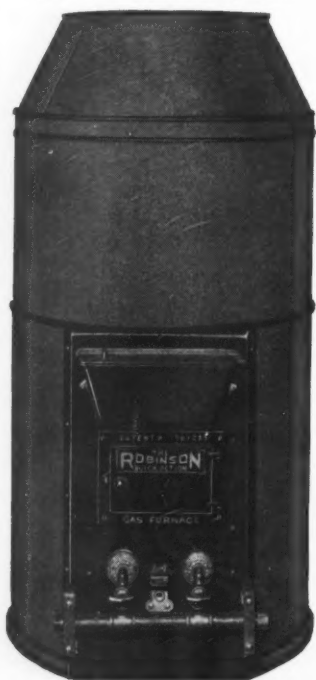
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City _____

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\$55 less casing
F. O. B. Massillon, Ohio



Pat. March 24, 1925
Pat. No. 1531223

All drum joints are electrically welded assuring an absolutely tight job.

OUR ANSWER

To the Most Important Question Confronting Dealers Today

THE ROBINSON

Quick Action Warm Air Gas Furnace

Every live dealer knows the tremendous stride gas has made in the warm air field during the past year and he also knows he must be in position to meet any and all competition if he is to remain in business.

Every dealer should be on his toes RIGHT NOW going after this new business and you can be assured in offering a ROBINSON QUICK ACTION you are offering the best, backed by a company that has had years of experience in manufacturing warm air gas fired furnaces.

In this comparatively new heating field a dealer must take into consideration the length of time a product has been on the market and whether or not it will stand the rigid test of performance required of it. There is only one way to make this test and that is to have your product give complete satisfaction year after year.

Ask yourself this question: "How many manufacturers of warm air gas fired furnaces can furnish me with performance records of their product covering a period of six years?" In our files we have many unsolicited letters over a long period of years showing how completely satisfied are the users of the ROBINSON QUICK ACTION GAS FURNACE.

Write for complete information immediately

THE A. H. ROBINSON COMPANY, Massillon, Ohio

If you want to increase your Sheet Metal Business

Give Your Architect
a Copy of

Standard Practice in SHEET METAL WORK

Published by the
National Association of
Sheet Metal Contractors

SEND THE COUPON FOR FULL DETAILS

AMERICAN ARTISAN
139 North Clark Street, Chicago

Tell me all about the big Association Book Standard Practice in Sheet Metal Work.

Name.....

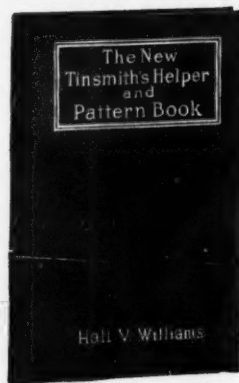
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Measures
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One of the Best and Most Popular Books

on tinsmithing and elementary sheet metal work. This is the latest edition and the contents are new excepting the chapter on Mensuration, which has been re-arranged and amplified, and possibly some fifty pages of problems and tables which are classified to the phase of the work they cover.

This Book Covers Simple Geometry and Every Phase of Modern Pattern Cutting

from the making of every type of Seam, Lap and Joint, to Conical Problems and Tinware, Elbows, Piping, Ducts, Gutters, Leaders, Cornice and Skylight Work and Furnace Fittings.

In fact an excellent all-around book for every man in the trade. Mr. Williams writes in an easy-to-read, helpful manner, giving you all the necessary details about each subject he handles.

You should add this widely read book to your collection now.

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"SHUR-LOCK" CONDUCTOR PIPE
"E-Z FIT" EAVES TROUGH
EAVES TROUGH HANGERS
"QUAKER CITY" MITERS
END PIECES, CAPS
AND OUTLETS

PIPE HOOKS

PIPE FASTENERS

CONDUCTOR HEADS

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STRAPS AND ENDS

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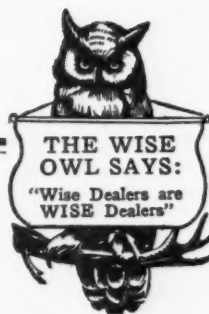
Furblo

**—the FURNACE BLOWERS
 with CERTIFIED RATINGS**

The installation of Furblo in any warm air heating job can be made with full confidence that it will perform as we say it will. Ratings are computed according to the standard code of the A. S. H. & V. E. and are absolutely guaranteed to be correct as stated. The new square-casing Furblo is shown above—one of a completely redesigned and improved line. Write for descriptive folder showing the others. No obligation.

**3
 TYPES**

LAKESIDE CO., Hermansville, Michigan
Makers of Lakeside Ventilating Systems



WISE

A BALANCED LINE

Over a quarter century ago, the WISE FURNACE COMPANY of Akron, Ohio, was instituted with one thought in mind—to build a balanced line of high quality—an institution of good service and fair dealing—and a line which would bring credit to the dealer and the manufacturer. Through the quarter century, WISE has always lived up to this unusual idea.

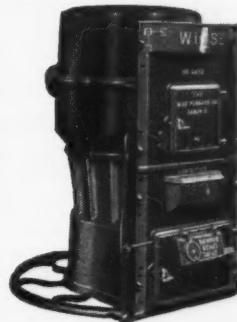


WISE 20 SERIES

One of the balanced line is the Wise "20 Series"—cast furnaces with all the ordinary features and with many added unusual, up to date features. The Wise "20 Series" return flue, radiator type cast furnace boasts of many features, among them exclusive patented radiator construction which eliminates objectionable dirt collecting and the flue clean-out nuisance. The outstanding construction of the Wise "20 Series" will bring credit to you as a furnace installer. Wise dealers are **WISE Dealers**.

WISE 40 SERIES

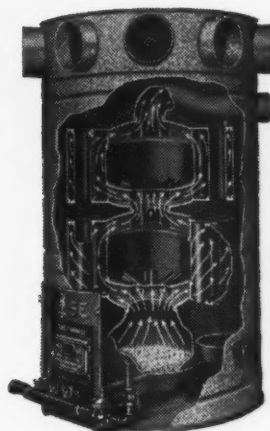
The Wise "40 Series" is the open dome type with the new cellular one-piece firepot, which insures evenly distributed air blast and provides complete combustion. Extra heavy castings, ribbed firepot, shaker handle and engineered design. Another of the WISE BALANCED LINE.



WISE GAS FIRED

In presenting the Wise Super-Efficient Gas Fired Furnace, we realize that the WISE reputation must be upheld. Therefore, months of engineering, experimenting, testing and proving stand back of this—the WISE GAS FIRED FURNACE.

You can better realize the importance of this—the GAS FIRED WISE—by reading the WISE booklet, "Wise Gas Furnaces." We recommend that you write for this booklet immediately. Gas Fired Furnaces are fast coming to the front.



Write for Catalogs No. 23 and G2

THE WISE FURNACE CO.

AKRON

OHIO

WISE DEALERS SELL WISE FURNACES

Mention AMERICAN ARTISAN in your reply—Thank you!

~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices to which must be added territory differentials

METALS

PIG IRON	
Chicago Fdy., No. 2	\$17.50
Southern Fdy. No. 2	17.01
Lake Superior Charcoal	27.04
Malleable	17.50

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES	
IO 20x28 112 sheets	\$23.80
IX 20x28 112 sheets	27.45
IXX 20x28 56 sheets	14.95
IXXX 20x28	16.10
IXXXX 20x28	17.35

TERNE PLATES

	Per Box
IO 20x28, 40-lb. 112 sheets	\$23.50
IX 20x28, 40-lb. 112 sheets	28.00
IX 20x28, 25-lb. 112 sheets	20.05
IX 20x28, 25-lb. 112 sheets	22.90
IX 20x28, 20-lb. 112 sheets	18.55
IV 20x28, 20-lb. 112 sheets	21.35

"ARMCO" INGOT IRON PLATES	
No. 8 ga.—110 lbs.	\$4.15
3/16 in.—100 lbs.	4.05
1/2 in.—100 lbs.	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28	\$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IO, 20x28	12.75
Cokes, 135 lbs., base, IX, 20x28	14.75
Cokes, 155 lbs., base, 2X, 56 sheets	8.50
Cokes, 175 lbs., base, 3X, 56 sheets	9.35
Cokes, 195 lbs., base, 4X, 56 sheets	10.25

BLUE ANNEALED SHEETS

Base 10 ga.	per 100 lbs. \$3.35
"Armco" 10 ga.	per 100 lbs. 4.15

ONE PASS COLD ROLLED BLACK

No. 18-20	per 100 lbs. \$3.55
No. 22	per 100 lbs. 3.70
No. 24	per 100 lbs. 3.75
No. 26	per 100 lbs. 3.85
No. 27	per 100 lbs. 3.90
No. 28	per 100 lbs. 4.00

GALVANIZED

No. 16	per 100 lbs. \$3.85
No. 18	per 100 lbs. 4.00
No. 20	per 100 lbs. 4.15
No. 22	per 100 lbs. 4.20
(Standard differentials on extras to apply)	
No. 24	per 100 lbs. 4.35
No. 26	per 100 lbs. 4.60
No. 27	per 100 lbs. 4.70
No. 28	per 100 lbs. 4.85
"Armco" 24	per 100 lbs. 5.85

BAR SOLDER

Warranted 50-50	per 100 lbs. \$19.25
45-55	per 100 lbs. 17.00
48-52	per 100 lbs. 17.75
Plumbers'	per 100 lbs. 15.50

ZINC

In Slabs	\$5.00
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SHEET ZINC

Cask Lots (600 lbs.)	\$12.00
Sheet Lots (100 lbs.)	13.00

BRASS

Sheets, Chicago base	17 1/2 %
Tubing, brazed, Chicago base	24 %
Tubing, seamless, Chicago base	22 1/2 %
Wire, Chicago base	17 %
Rods, Chicago base	15 %

COPPER

Sheets, Chicago base	19 %
Tubing seamless, Chicago base	22 %
Wire, plain rd., 8 B. & S. Ga. and heavier	12 %

LEAD

American Pig	\$6.00
Bar	7.50

TIN

Bar Tin	per 100 lbs. \$33.00
Pig Tin	per 100 lbs. 32.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16	5c per lb.
Roll board	5 1/2 c per lb.
Mill board 3/32 to 1/4	5 1/2 c per lb.
Corrugated paper (250 sq. ft. per roll)	\$4.00 per roll

ASBESTOS SEGMENTS

8 in.	per 25 sets \$1.85
9 in.	per 25 sets 2.10
10 in.	per 25 sets 2.35
12 in.	per 25 sets 2.65

CEMENT FURNACE

5-lb. cans, net	\$0.40
10-lb. cans, net	0.80
25-lb. cans, net	2.00
Per 100 lbs.	7.50

CLIPS

Damper	
No-Rivet Steel, with tail pieces, per gross	\$9.50
Rivet Steel, with tail pieces, per gross	7.50
Tail pieces, per gross	2.40

COPPER FOOTING

Copper Footing	43 %
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CORNICE BRAKES

Chicago Steel Bending	
Nos. 1 to 6B	Net

CUT-OFFS

Gal. plain, round or cor. rd.	
26 gauge	30 %
28 gauge	35 %

DAMPERS

Yankee Warm Air	
7 in. doz.	\$1.60
8 in. doz.	2.20
9 in. doz.	2.60
10 in. doz.	2.80
12 in. doz.	3.50
14 in. doz.	5.00

EAVES TROUGH

Galv. Crimpedge, crated	75-15 %
Zinc	60 %

ELBOWS

Conductor Pipe	
Galv. plain or corrugated, round flat Crimp.	
28 gauge	60-10 %
26 gauge	50 %
24 gauge	15 %

Galv. Terne Steel	
Plain Rd. and Rd. Corr.	
28 gauge	60-10 %
26 gauge	50 %
24 gauge	15 %

Square Corrugated

28 gauge	55 %
26 gauge	40 %

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5 %
Nested solid	70 & 5 %

Sq. Corr., A. & B. & Octagon

28 gauge	55 %
26 gauge	40 %

Portico

1, 1 1/4, 1 1/2 inch	45 %
----------------------	------

Copper

16 oz. all designs	50 %
--------------------	------

Zinc

All styles	60 %
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ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue	
No. 28 Gauge, Doz.	
5 inch	\$1.15
6 inch	1.25
7 inch	1.75

Adjustable—Uniform Blue

No. 28 Gauge, Uniform Blue.	
5 inch	\$1.60
6 inch	1.75
7 inch	2.10

WOOD FACES—60 % off list.

FIRE POTS

No. 02 Gasoline Torch, 1 qt.	\$ 5.13
No. 9250, Kerosene, or Gasoline Torch, 1 qt.	6.50
No. 10 Tinner's Furnace Square tank, 1 gal.	11.20
No. 15 Tinner's Furnace Round tank, 1 gal.	10.70
No. 21 Gas Soldering Furnace	8.00
No. 110 Automatic Gas Soldering Furnace	10.50

GLASS

Single and Double Strength, A, all brackets	85 %
Single and Double Strength, B, all brackets	87 %

HANGERS

Conductor Pipe	
Milcor Perfection Wire	25 %
Milcor Triplex Wire	10 %

Eaves Trough

Steel (galv. after forming) from list	45 %
Selflock E. T. Wire, List	10 %

HOOKS

Conductor	
"Direct Drive" Wrought Iron for wood or brick	15 %

MITRES

Galvanized Steel Mitres	
28 gauge	70-15 %
26 gauge	70-5 %

PASTE

Asbestos Dry Paste

200-lb. barrel	\$14.00
100-lb. barrel	7.50
50-lb. pail	4.25
25-lb. pail	2.15
10-lb. bag	1.00
5-lb. bag	0.50

PIPE

Galvanized	
Crated and nested (all gauges)	75-12 1/2 %
Crated and not nested (all gauges)	75-7 1/2 %

Furnace Pipe

Double Wall Pipe and Fittings	60 %
Single Wall Pipe, Round Galvanized Pipe	60 %
Galvanized and Tin Fittings	60 %

Lead

Per 100 lbs.	\$12.50
Store Pipe	
"Milcor" "Titelock" Uniform Blue	
28 gauge, 5 inch U. C. nested	\$10.00
28 gauge, 6 inch U. C. nested	11.00
28 gauge, 7 inch U. C. nested	13.00
30 gauge, 5 inch U. C. nested	9.25
30 gauge, 6 inch U. C. nested	10.00
30 gauge, 7 inch U. C. nested	12.00

T-Joint Made Up

6 inch, 28 ga.	per doz. \$3.40
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REGISTERS AND FACES

Floor Registers	
Steel and Semi-Steel	40 & 10 %
All Cast Iron	20 %

Baseboard

2-Piece	40 & 10 %
1-Piece	40-10 & 20 %

Adjustable Ventilators

Adjustable Ventilators	40 & 10 %
------------------------	-----------

COLD AIR FACES

Steel and Cast, less than 14" width	40 & 10 %
Steel, 14" and wider	65 & 10 %
Cast, 14" and wider	60 & 10 %
Special Cold Air Faces, Steel or Cast	40 & 10 %

RIDGE ROLL

Galv. Plain Ridge Roll, b'dd	75-15-5 %
Galv., Plain Ridge Roll, crated	75-15 %

SCREWS

Sheet Metal	
7, 1/2 x 1/4, per gross	\$0.52
No. 10, 1/4 x 3/16, per gross	0.68
No. 14, 1/4 x 1/4, per gross	0.83

SHEARS, TINNERS' AND MACHINISTS'

Viking	\$22.00
--------	---------

Lennox Throatless

No. 18	35 %
Shear blades	10 %
(f. o. b. Marshalltown, Iowa.)	

SHOES

Galv. 28 Gauge, Plain or Corrugated, round flat crimp	60-10 %
26 gauge, round flat crimp	50 %
24 gauge, round flat crimp	15 %

SNIPS

Tinners'	Net
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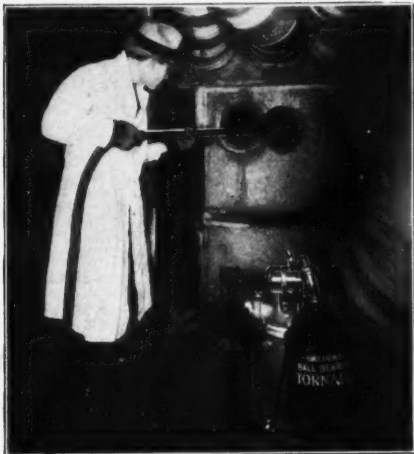
VENTILATORS

Standard	30 to 40 %
Milcor	Net

Breuer's Ball Bearing Tornado Furnace Cleaner

100
Per Cent
of All
Furnaces
Need
Cleaning

60
Per Cent
of All
Furnaces
Need
Repairing



Facts show that 60 per cent of all furnaces need repairing—but how much of this percentage do you get? The only sure way to get more repair business is by offering TORNADO Cleaning Service at a nominal charge.

You not only make a profit on the cleaning job but you are able to get into the basement and suggest repairs—and even sell new furnaces.

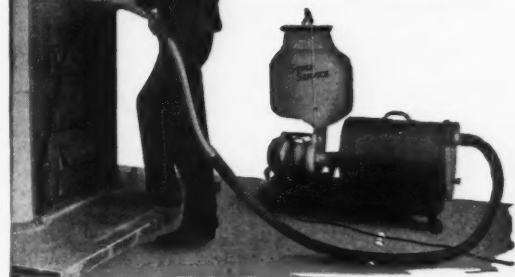
Protect and build your business with TORNADO Cleaning Service. It keeps customers satisfied and brings in new business. The TORNADO Furnace Cleaner is the lightest unit built—weighs only 30 pounds, a one man outfit—lowest in cost, only \$149.50 complete—most powerful, oversized 2/5 H.P. G.E. Universal Motor mounted on Norma Precision Ball Bearings—10 gallon steel tank dust receptacle mounted on large castors, neatly polished aluminum lid and power unit—easily cleaned—just the cleaner to build profits at low cost. Write for complete information on our three days' free trial offer.

BREUER ELECTRIC MFG. CO.

865 Blackhawk St.

Chicago, Ill.

700 Dollars
In New Business
Came from Cleaning
One Furnace



This one-man outfit makes low overhead

\$700 of new business—a complete heating replacement—fell to W. A. Rummel of South Bend, Ind., a Super Suction owner who first sold a furnace cleaning job for \$4. What better proof of the profit from furnace cleaning? Not luck, but industry; directed first to cleaning.

All furnace rooms are open to the man rightly equipped to do cleaning. He is well paid for that and repairs and replacements pile up more velvet.

Try a Super Suction three days free. Ask today for details and for a free copy of your cleaning pilot: *The Plan Book*

THE NATIONAL SUPER SERVICE CO.
1944 North 13th Street
Toledo, Ohio

**THIS SMALL AD MEANS JUST
AS MUCH TO YOU AS A FULL
PAGE.**

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A COMPLETE LINE OF REGISTERS AND
FACES FOR ALL REQUIREMENTS

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3117-23 Minnesota Avenue St. Louis, Mo.

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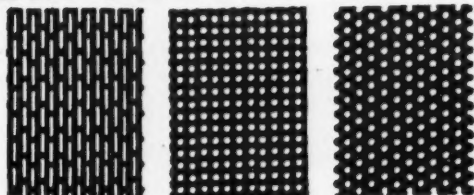
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FOR that touch of refinement install **AMERICAN WOOD REGISTERS**. The wood register with a glowing history of over twenty-one years. Extra value without extra cost.

Write for catalog and price list

THE AMERICAN WOOD REGISTER CO.
PLYMOUTH INDIANA

PERFORATED METALS



All Sizes and Shapes of Holes
In Steel, Zinc, Brass, Copper, Tinplate, etc.
For All Screening, Ventilating and Draining
EVERYTHING IN PERFORATING METAL

THE HARRINGTON & KING PERFORATING CO.

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NEW YORK OFFICE: 114 LIBERTY ST.

OSBORN GOLDEN STAR

SIZES
3½", 4", 5"
and 6"



HANGERS

Made in our own plant from 16 Ga. Galvanized Steel or Ingot Iron—Also Copper and Brass—are practical—economical—and easy to install!

Let Us Send You a Sample



OSBORN
DETROIT-CLEVELAND-BUFFALO

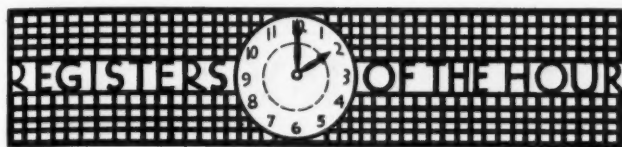
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Air Cleaners American Fdy. & Furnace Co., Bloomington, Ill. Independent Air Filter Co., Chicago, Ill. Kleenaire Filter Co., Stevens Point, Wis. Meyer & Bro. Co., F., Peoria, Ill. Watt Mfg. Co., Sterling, Ill.	Dampers—Quadrants—Accessories Aeolus Dickinson, Chicago, Ill. Hart & Cooley Co., Holland, Mich. Howes Co., S. M., Boston, Mass. Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C. Parker-Kalon Corp., New York, N. Y.	Furnace Pulleys Hart & Cooley Co., Holland, Mich.	Handles—Furnace Door Fanner Mfg. Co., Cleveland, Ohio
Air Washers A. Gehri & Co., Tacoma, Wash. Watt Mfg. Co., Sterling, Ill.	Dampproofings Lastik Products Corp., Pittsburgh, Pa.	Furnace Regulators Noll Regulator Co., Youngstown, Ohio Sheer Co., H. M., Quincy, Ill. White Mfg. Co., Minneapolis, Minn.	Hangers—Eaves Trough Berger Bros. Co., Philadelphia, Pa. Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Aluminum Sheets J. M. & L. A. Osborn Co., Cleveland, Ohio	Diffuser—Aid Duct Aeolus Dickinson, Chicago, Ill.	Furnace Rings Forest City Foundries Co., Cleveland, Ohio	Heat Regulation Systems Noll Regulator Co., Youngstown, Ohio White Mfg. Co., Minneapolis, Minn.
Asbestos—Liquid Technical Products Co., Pittsburgh, Pa.	Drills—Electric J. M. & L. A. Osborn Co., Cleveland, Ohio The Stanley Electric Tool Co., New Britain, Conn.	Furnaces for Gas or Oil Dail Steel Products Co., Lansing, Mich.	Heaters—Cabinet Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. Motor Wheel Corp., Heater Division, Lansing, Mich. Waterman-Waterbury Co., Minneapolis, Minn.
Asbestos Paper Standard Asbestos Co. of Chicago, Chicago, Ill. Wilson, Grant, Inc., Chicago, Ill.	Drive Screws—Hardened Metallic Parker-Kalon Corp., New York	Furnaces—Gas Calkins & Pearce, Columbus, Ohio Henry Furnace and Foundry Co., Cleveland, Ohio Lennox Furnace Co., Marshalltown, Iowa Robinson Co., A. H., Massillon, Ohio Wise Furnace Co., Akron, Ohio Western Steel Products Co., Duluth, Minn.	Heaters—School Room Meyer Furnace Co., The, Peoria, Ill. Western Steel Products Co., Duluth, Minn. Waterman-Waterbury Co., Minneapolis, Minn.
Blast Gates Berger Bros. Co., Philadelphia, Pa.	Eaves Trough Barnes Metal Products Co., Chicago, Ill. Berger Bros. Co., Philadelphia, Pa. Chicago Metal Mfg. Co., Chicago, Ill. Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C. Rockford Sheet Steel Co., Rockford, Ill.	Furnaces—Oil Burning Motor Wheel Corp., Heater Div., Lansing, Mich.	Humidifiers Automatic Humidifier Co., Cedar Falls, Iowa Diener Mfg. Co., G. W., Chicago, Ill. Meyer & Bro. Co., F., Peoria, Ill. Sallada Mfg. Co., Minneapolis, Minn.
Blowers—Furnace American Fdy. & Furnace Co., Bloomington, Ill. American Machine Products Co., Marshalltown, Iowa Brundage Co., Kalamazoo, Mich. A. Gehri & Co., Tacoma, Wash. Lakeside Co., Hermansville, Mich. Watt Mfg. Co., Sterling, Ill.	Elbows and Shoes—Conductor Barnes Metal Products Co., Chicago, Ill. Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C. Rockford Sheet Steel Co., Rockford, Ill.	Furnaces—Warm Air Agrícola Furnace Co., Gadsden, Ala. American Fdy. & Furnace Co., Bloomington, Ill. American Furnace Co., St. Louis, Mo. The Beckwith Co., Dowagiac, Mich. Brillion Furnace Co., Brillion, Wis. Dail Steel Products Co., Lansing, Mich. Deshler Foundry & Machine Works, Deshler, Ohio Enterprise Boiler & Tank Works, Chicago, Ill. Forest City Foundries Co., Cleveland, Ohio Graff Furnace Co., Scranton, Pa. Hall-Neal Furnace Co., Indianapolis, Ind. Henry Furnace & Fdy. Co., Cleveland, Ohio Lennox Furnace Co., Marshalltown, Iowa Syracuse, N. Y. May Flebeger Furnace Co., Newark, Ohio Meyer Furnace Co., The, Peoria, Ill. Midland Furnace Co., Columbus, Ohio Motor Wheel Corp., Heater Div., Lansing, Mich. Peerless Foundry Co., Indianapolis, Ind. Premier Warm Air Heater Co., Dowagiac, Mich. Rybolt Heater Co., Ashland, Ohio Schwab Furnace & Mfg. Co., Milwaukee, Wis. Standard Fdy. & Furnace Co., De Kalb, Ill. Waterman-Waterbury Co., Minneapolis, Minn. Western Steel Products Co., Duluth, Minn. Wise Furnace Co., Akron, Ohio	Lath—Expanded Metal Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Bolts—Stove Lamson & Sessions Co., Cleveland, Ohio Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.	Filters—Furnace Independent Air Filter Co., Chicago, Ill. Kleenaire Filter Co., Stevens Point, Wis.	Gas Burning Attachments Calkins & Pearce, Columbus, Ohio	Machines—Crimping Bertsch & Co., Cambridge City, Ind. Yoder Co., The, Cleveland, O.
Brakes—Bending Dreis & Krump Mfg. Co., Chicago, Ill. Interstate Machinery Co., Chicago, Ill. Peck, Stow & Wilcox Co., Southington, Conn. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.	Fittings—Conductor Barnes Metal Products Co., Chicago, Ill. Braden Mfg. Co., Terre Haute, Ind. Chicago Metal Mfg. Co., Chicago, Ill. Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.	Grilles Auer Register Co., Cleveland, Ohio Chicago Perforating Co., Chicago Harrington & King Perforating Co., Chicago, Ill. Hart & Cooley Co., New Britain, Conn. Independent Register & Mfg. Co., Cleveland Tuttle & Bailey Mfg. Co., New York U. S. Register Co., Battle Creek, Mich.	Machinery—Culvert Bertsch & Co., Cambridge City, Ind. Interstate Machinery Co., Chicago, Ill.
Brakes—Cornice Dreis & Krump Mfg. Co., Chicago, Ill.	Flanges Chicago Metal Mfg. Co., Chicago, Ill.	Guards—Machine and Belt Harrington & King Perforating Co., Chicago, Ill.	Machinery—Rebuilt Interstate Machinery Co., Chicago Chas. Molitor Machinery Co., Chicago
Brass and Copper American Brass Co., Waterbury, Conn.	Fluxes—Soldering Kester Solder Co., Chicago, Ill. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.	Furnace Cement Connors Paint Mfg. Co., Wm., Troy, N. Y. Lastik Products Corp., Pittsburgh, Pa. Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C. Technical Products Co., Pittsburgh, Pa.	Machines—Tinsmith's Bertsch & Co., Cambridge City, Ind. Dreis & Krump Mfg. Co., Chicago, Ill. Hyro Mfg. Co., New York, N. Y. Interstate Machinery Co., Chicago, Ill. Marshalltown Mfg. Co., Marshalltown, Iowa Osborn Co., The J. M. & L. A., Cleveland, Ohio Peck, Stow & Wilcox Co., Southington, Conn. Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve. The Stanley Electrical Tool Co., New Britain, Conn. Viking Shear Co., Erie, Pa. Whitney Mfg. Co., W. A., Rockford, Ill. Yoder Co., The, Cleveland, O.
Cans—Garbage Diener Mfg. Co., G. W., Chicago, Ill. Osborn Co., The J. M. & L. A., Cleveland, Ohio	Furnace Chain Hart & Cooley Co., Holland, Mich.	Handles—Boiler Berger Bros. Co., Philadelphia, Pa.	Metals—Perforated Chicago Perforating Co., Chicago Harrington & King Perforating Co., Chicago, Ill.
Castings—Malleable Fanner Mfg. Co., Cleveland, Ohio	Furnace Cleaners—Suction Breuer Electric Mfg. Co., Chicago Brillion Furnace Co., Brillion, Wis. National Super Service Co., Toledo, Ohio J. M. and L. A. Osborn Co., Cleveland, O. B. F. Sturtevant Co., Boston, Mass.	Handles—Soldering Iron Hyro Mfg. Co., New York, N. Y.	Miters—Eaves Trough Barnes Metal Products Co., Chicago, Ill. Berger Bros. Co., Philadelphia, Pa. Braden Mfg. Co., Terre Haute, Ind. Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Ceilings—Metal Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.	Furnace Fans A-C Mfg. Co., Pontiac, Ill. American Fdy. & Furnace Co., Bloomington, Ill. Brundage Co., The, Kalamazoo, Mich. Lakeside Co., Hermansville, Mich. Robinson Co., A. H., Massillon, Ohio Watt Mfg. Co., Sterling, Ill.	Covering—Asbestos Standard Asbestos Co. of Chicago, Chicago, Ill. Wilson, Grant, Inc., Chicago, Ill.	Miters—Eaves Trough Barnes Metal Products Co., Chicago, Ill. Berger Bros. Co., Philadelphia, Pa. Braden Mfg. Co., Terre Haute, Ind. Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Chaplets Fanner Mfg. Co., Cleveland, Ohio	Furnace Filters Independent Air Filter Co., Chicago, Ill. Kleenaire Filter Co., Stevens Point, Wis.	Cut-offs—Rain Water Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.	Continued on page 62)

Say you saw it in AMERICAN ARTISAN—Thank you!



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AUER Quality Merchandise Is Your Satisfaction

There is an AUER Register and Grille for every need—the *Colonial*, *Aueristocrat*, *Economy*, and *Pro-Tex-Wall*—but the catalog will tell you better. Write for it today.

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Entirely Different
Write for Details

Correct and Controlled Humidity

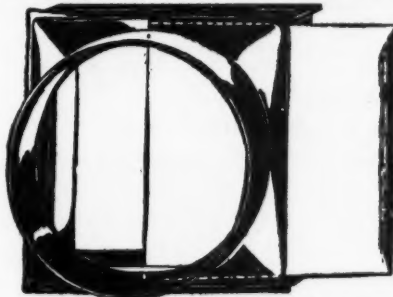
THE Automatic Drip Humidifier is unlike all others. The amount of humidity desired is *regulated*. It is simple, fool-proof, durable, reliable and high grade in every respect.

For every warm air heating installation and especially desirable with oil heat because of control feature.

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- 3 Protection Against Moisture
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SEAMLESS FURNACE**
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CASH IN ON OIL BURNER PROFITS

Everybody wants oil heating—
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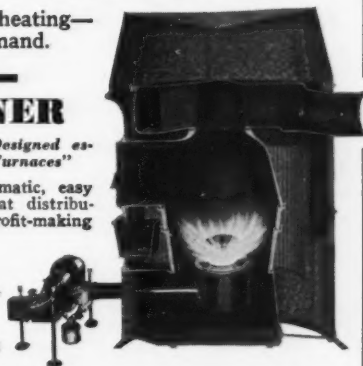
"A Low Priced Burner—Designed especially for Warm Air Furnaces"

Dependable, efficient, automatic, easy to operate, gives even heat distribution, practical and a profit-making line.

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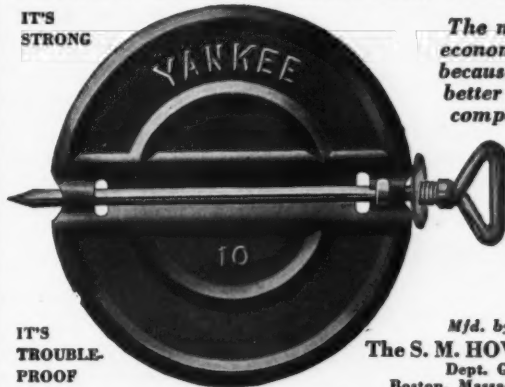
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Corporation

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IT'S
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The most
economical
because it's
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IT'S
TROUBLE-
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CRANKS for STOVES and FURNACES

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Brookside Park Cleveland, Ohio

Mention AMERICAN ARTISAN in your reply—Thank you!

BUYERS' DIRECTORY

(Continued from page 60)

Nails—Hardened Masonry
Parker-Kalon Corp., New York, N. Y.

Oil Burners
Berryman System of Oil Heating, Inc., Chicago, Ill.
Bettendorf Mfg. Co., Bettendorf, Iowa
Rock Oil Burner Co., Madison, Wis.
Mellvaine Burner Corp., Evanston, Ill.
Northern Oil Burners Inc., Minneapolis, Minn.
Silent Automatic Corp., Detroit, Mich.

Paint
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Perforated Metals
Harrington & King Perforating Co., Chicago, Ill.

Pipe and Fittings—Furnace
Henry Furnace & Fdy. Co., Cleveland, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peerless Foundry Co., Indianapolis, Ind.

Pipe and Fittings—Stove
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Pipe—Conductor
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Pipe—Spiral
Chicago Metal Mfg. Co., Chicago, Ill.

Punches
Bertsch & Co., Cambridge City, Ind.
Hyro Mfg. Co., New York
Interstate Machinery Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
W. A. Whitney Mfg. Co., Rockford, Ill.

Punches—Combination Bench and Hand
Hyro Mfg. Co., New York, N. Y.

Punches—Hand
Hyro Mfg. Co., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

Putty—Stove
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets
Hart & Cooley Co., Holland, Mich.
Tuttle & Bailey Mfg. Co., New York

Registers—Warm Air
Auer Register Co., Cleveland, Ohio
Forest City Foundries Co., Cleveland, Ohio
Hart & Cooley Co., Holland, Mich.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register & Mfg. Co., Cleveland, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Rock Island Register Co., Rock Island, Ill.
Symonds Register Co., St. Louis, Mo.
Tuttle & Bailey Mfg. Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.

Registers—Wood
American Wood Register Co., Plymouth, Ind.
Auer Register Co., Cleveland, Ohio
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Regulators—Heat
Modern Heat Regulator Co., Cleveland, Ohio
Time-O-Stat Controls, Div. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
White Mfg. Co., Minneapolis, Minn.

Ridging
American Rolling Mill Co., Middletown, Ohio
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Rolls—Forming
Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Roofing Cement
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Roof Paints
Lastik Products Corp., Pittsburgh, Pa.

Roof—Flashing
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Roofing—Iron and Steel
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Ryerson & Sons, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Roofing—Tin
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Rubbish Burners
Hart & Cooley Co., Holland, Michigan

School—Sheet Metal Pattern Drafting
St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating
St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping, Sheet Metal
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., New York

Screens—Perforated Metal
Harrington & King Perforating Co., Chicago, Ill.

Scuppers
Aeolus Dickinson, Chicago, Ill.

Shears—Hand and Power
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Yoder Co., The, Cleveland, O.

Sheet Metal Screws—Hardened, Self-Tapping
Parker-Kalon Corp., New York

Sheets—Alloy
International Nickel Co., New York, N. Y.
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Black and Galvanized
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Iron
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Shingles and Tiles—Metal
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Sifters—Ash
Diener Mfg. Co., G. W., Chicago, Ill.

Sky Lights
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Snips
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Acid Core
Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Self-Fluxing
Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Rosin Core
Kester Solder Co., Chicago, Ill.

Solder
Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Soldering Furnaces
Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Specialties—Hardware
Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning
Fanner Mfg. Co., Cleveland, Ohio

Tinplate
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Tools—Tinsmith's
Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.

Torches
Diener Mfg. Co., G. W., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Trimnings—Stove and Furnace
Fanner Mfg. Co., Cleveland, Ohio

Vacuum Cleaner—Furnace
Breuer Electric Mfg. Co., Chicago
Brillion Furnace Co., Brillion, Wis.
National Super Service Co., Toledo, Ohio
J. M. and L. A. Osborn Co., Cleveland, O.
B. F. Sturtevant Co., Boston, Mass.

Ventilators—Floor
Aeolus Dickinson, Chicago, Ill.

Ventilators—Roof
Aeolus Dickinson, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Paul R. Jordan & Co., Indianapolis, Ind.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Ventilators—Ceiling
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Reg. & Mfg. Co., Cleveland, Ohio

Wood Faces—Warm Air
Auer Register Co., Cleveland, Ohio
American Wood Register Co., Plymouth, Ind.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

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Roof Cement—Stove Putty
Plumbers Putty

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The "Torrid" Furnace is designed to give a tremendous amount of heat, much more than that furnished by the ordinary tinner's furnace.

A fuel saver and generating machine of the finest quality made at the price.

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Chicago

CHICAGO STEEL SLITTING SHEAR

LIGHT—POWERFUL
DURABLE



Capacity 10 gauge sheets
Any Length or Width
Flat Bars 3/16x2"
Weight 22 pounds

Price \$15.00 Net

F. O. B. Chicago

Made of pressed steel and equipped with hold-down. Blades of highest grade crucible steel. Most indispensable high grade shears made. Equal to other shears selling at over twice the price. **ORDER YOURS TODAY.**

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EXTRA DIES AND PUNCHES

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WHITNEY *Lever* PUNCHES.



1	also Nos.
2	5
4	7
No. 6 Sky-light	7½
8	
and	and
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A Whitney Punch for every use
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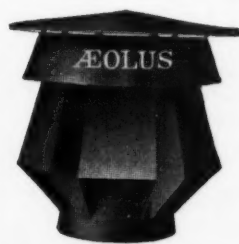
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Compound lever handle—removable blades. Upper blade away from mechanic enabling easy following of work—an exclusive Viking feature.



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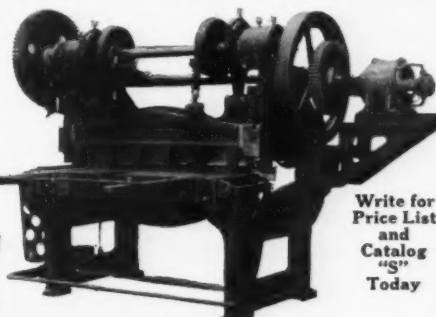
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BELT
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Takes
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Heaviest
Plates

Built in all
Standard
Sizes and
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Write for
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Alphabetical List of Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with an asterisk.

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Hall-Neal Furnace Co.*.....	Time-O-Stat Controls, Div. Minneapolis- Honeywell Regulator Co.*.....
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Kleenaire Filter Co.*.....		

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Classified Advertising

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddle Company, Marshfield, Wis.

For Sale—Retail Furnace and Sheet Metal Business. Established eighteen years. Have approximately 800 furnaces installed by us in this County needing service and repairs. Will sell for invoice price of tools and fixtures of about \$1,000. No stock to sell. Address Huron Furnace Company, Huron, South Dakota. C-535

For Sale—Sheet metal and furnace business. A going business. Reason for selling, retiring. Near St. Louis, Missouri. Price, \$800, complete. Address R-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Take advantage of this opportunity to buy a well equipped sheet metal shop and running business located in one of Chicago's best suburbs. For particulars write X-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—West Side Sheet Metal Works of Cleveland, Ohio. Full set of tools, machines, stock on hand, and truck. First offer for \$1700 cash takes the lot. Owner will retire. Good chance for a live wire mechanic. Address J. F. L., 2173 West 103rd Street, Cleveland, Ohio. F-536

Wanted—Small stock of hardware and plumbing in good town of 1000 to 4000. Not too much competition. Can invest up to \$6000 if priced right. Might raise more if necessary. Address O-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

BUSINESS CHANCES

For Sale—Plumbing, heating and tin shop in one of the best towns in north east Nebraska and in the best farming community in the state. Will sell at a bargain if taken at once. Must sell on account of failing eyesight. Stock and tools about \$4500. \$1500 will handle it by the right party. Have done \$30,000 business in a year. This is a snap for a good mechanic. Address D-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

HELP WANTED

For experienced furnace salesmen or manufacturers' agents that are acquainted with furnace and sheet metal trade, we have several open territories at the present time on straight commission basis. In replying please give past experience and present connections. Address Agricola Furnace Company, Gadsden, Alabama. Z-535

Wanted—An all-round man. One that can do tinning and furnace work, who can do selling, also help in hardware store in town of 600 population in southern Wisconsin. Address B-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Manufacturers' Agents

Wanted to sell our furnace cement, roofing paint and cement and calking compounds. Our consistent trade paper advertising is creating demand. Exclusive territory given with liberal commission. Address X-533, AMERICAN ARTISAN, 139 N. Clark Street, Chicago, Illinois.

HELP WANTED

SALESMEN

who are permitted to carry side line, calling on furnace dealers, to sell furnace fans on commission. Address W-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

High grade furnace salesmen calling upon jobbing, sheet metal and furnace trade to handle a national line of Blowers and Air Conditioning equipment, as a full or part time occupation, on a commission basis. Address L-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

SITUATION WANTED

SITUATION WANTED

Heating estimator, experienced fully in all branches. Can sell, superintend or handle department. Address T-534, American Artisan, 139 N. Clark Street, Chicago, Illinois.

Situation Wanted—Experienced hardware clerk wishes steady position. Do plumbing, furnace repairing. Married. Don't drink or smoke. Good reference. Wish to locate in Middle-West. Address Ray Boyle, Payette, Idaho. W-534

Wanted—To correspond with an owner of sheet metal and heating shop, who is looking for a first class mechanic as a working partner or on percentage. Address E-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted by sheet metal worker with eighteen years experience in general sheet metal work, heating, and ventilating. Can estimate, lay out, and handle men. Am thirty-nine years old, married, sober, and steady. Prefer Union shop in Illinois with privilege to buy at some time. Address X-534, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

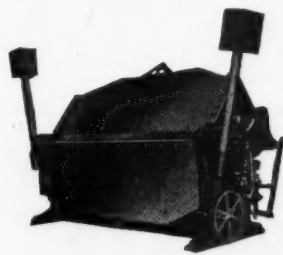
Situation Wanted—By a heating and ventilating man, capable of handling any difficult job. Willing to put mechanical skill against the best employed as to the wages received. State full particulars in first letter. Address Bert J. Hawkins, 903 Glenwood, Station 2, Owosso, Michigan. S-535

Situation Wanted—A strictly first class sheet metal mechanic, layout man and foreman is looking for a steady job. 32 years' experience on all kinds of work. Married, sober, steady, neat and accurate. A-1 references. Small city or town preferred. Please state particulars. Address Hiram, 1725 South Franklin Street, Muncie, Indiana. T-535

Situation Wanted—By a first class all-round tinning, plumbing and furnace man. Experienced in roofing work also. Steady position wanted. Will go anywhere. Address Arthur Klatt, 3749 Greenview Avenue, Chicago, Illinois. Y-535

Situation Wanted—By tinner and plumber; 20 years' experience. Would also invest in partnership. Address Wm. Meyer, Box 443, Monticello, Iowa. A-536

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60" Pettingell pow. rot. Slitting Shear \$50.00
5' x 16" gauge x 12" gap Bertsch grd. Squ. Shear \$125.00
Quick Work 20" cap. pow. rot. Slitting Shear \$40.00
20" Yoder Slitting Shear or Beader \$40.00
3/4" cap. x 30" throat Slitting Shear \$100.00
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SITUATION WANTED

Situation Wanted—By competent, sober sheet metal worker, plumber and furnace man, good on trunk line and duct work, also fan installations and air conditioning. Can handle anything in the above lines in up-to-date workmanlike manner. Address F-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—I am a practical sheet metal worker. Will go anywhere but would prefer a good shop to run on a percentage. Address L. J. Egan, 306 South Main Street, El Dorado, Kansas. Y-534

Situation Wanted—Experienced sales supervisor, heating, air conditioning, ventilation, domestic and industrial worker, wants connection in East. Take charge of sales, build sales crew and new business. Remuneration on percentage basis. Lay out own work, age 33. Will take entire charge on profit sharing basis. Address S. K. Martin, c/o W. Derr, 206 Kelker Street, Harrisburg, Pennsylvania. K-536

Are you in need of a City Salesman? Ten years experience in selling high grade cast, steel, and gas fired furnaces, also sheet metal. Do own estimating and lay out work either forced or gravity. Will work on commission with drawing account allowed. Seven years with one manufacturer. Good references. Address M-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

SITUATION WANTED

Situation Wanted—Competent executive wishes position in any line of the sheet metal or warm air heating industry. Capable of taking full charge of entire business, general job shop, warm air heating, oil burner construction and erection, and metal stamping, including the manufacture of furnace fittings. Twenty years at business. Twelve years as executive. Now holding responsible position, but wish to change location. Permanent position in congenial environment desired. Location no object. Salary, \$3500 to \$4000 per year. Available in 90 days. College education. Address J-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By first class tinner and furnace man. Engineering knowledge of warm air heating, layout, and pattern cutting. Accustomed to both city and country work. Steady and of good habits. For further information write stating full particulars. J. D. Grace, Elmer, Missouri. C-536

Situation Wanted—By first class sheet metal worker. Experienced in general lines, cornices, heating and special work. Good pattern cutter. Neat and accurate on shop and bench work. Health and habits good. Would consider partnership. Address E-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

TOOLS AND MACHINES

Wanted—36" squaring shears 16 gauge, 48" slip roll 14 gauge, 4 or 8' box pan brake 16 gauge, No. 12 Marshalltown Throatless shear. All tools must be priced cheap for cash. Write Portable Tank & Pump Company, Clarkson, Nebraska. A-535

Wanted—Set of used Tinnerns' tools and machines. Must be in A-1 condition. Address D-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Complete set of Tinnerns tools and machines (except brake), \$175.00. Address G-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—One 8-foot power squaring shear, 18 gauge capacity. One Power Ridge Roll machine in A-1 condition. Will be sold cheap if taken at once. Address B-534, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—One 30-inch square shears, \$20; one stovepipe crimper, \$5; one stovepipe folding machine, \$10; one 20-inch pipe folding machine, \$20; one grooving machine, \$15; one setting down machine, \$10; one turning and wiring machine, \$10. First check for \$75 takes the lot, or will sell each separate. Address Noble Sheet Metal Works, 119 South Stevens Street, Rhinelander, Wisconsin. J-535

Wanted—One second hand 8-foot brake, must be reasonable. Would also consider complete set of used tools for small shop. Address Gilt Edge Heating Company, 2514 East Dayton Street, Madison, Wisconsin. L-535

Wanted—Experienced stove and furnace salesman. Trade mark line for Illinois, Indiana, Michigan, and Ohio. State experience, age, salary, etc. Address H-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Wanted—One 8 foot or 10 foot steel cornice brake, 30 inch or 36 inch square shear, in good condition. Cash. Address G-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

MISCELLANEOUS

For Sale—Used correspondence course in sheet metal design and pattern drafting. Address Z-534, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Wanted—An old style Brillion furnace cleaner. Inquire 1234 Pennsylvania Avenue, North Side, Pittsburgh, Pennsylvania. B-535

For Sale—Complete equipment for manufacturing a modern line of double and single furnace pipe and fittings, elbows, etc. Also two valuable patents on a new design boiler plate oil burning warm air furnace. Low cost to manufacture; 60 per cent more efficient. Address K-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Wanted—Equipment for making tanks up to 1/4-inch capacity. Also equipment for making stock tanks, metal culverts, etc. Must be in good condition and reasonably priced. Address O-535, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

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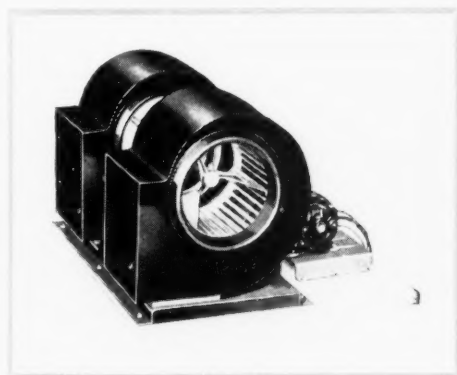
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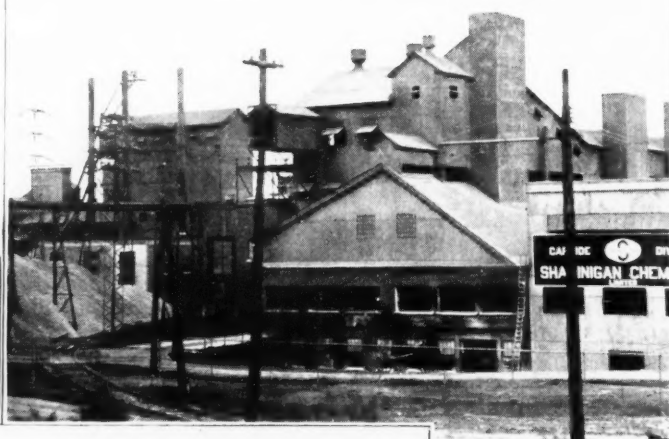
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